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Foreword

This report summarizes the activities of the Ministry's Resident Geologists during 1987, and includes accounts of mining, exploration, and geoscience activities in Ontario, prepared from information collected and filed by the Resident Geologists. The Petroleum Resources Section of the Ministry of Natural Resources is responsible for the petroleum resources program of the Province and the report if its Chief Geologist is included herein.

As a result of government restructuring, the Resident Geologists are now part of the field organization of the Mines and Minerals Division, Ministry of Northern Development and Mines. Sixteen Resident Geologists are stationed in 13 urban centres spread across three divisional regions - the Northwestern Region, the Northeastern Region and the Southern Ontario Region. Together with their staff, they provide geoscience information and advice on the geology and mineral deposits of their respective districts. Some realignment of responsibilities occurred in 1987.

In the Northwestern Region, the area formerly covered by the Thunder Bay Office has been partitioned into three districts - Thunder Bay, Beardmore-Geraldton and Schreiber-Hemlo. These districts are now served respectively by Resident Geologists, G.C. Patterson, J.K. Mason, and B.R. Schnieders, all stationed in Thunder Bay.

In the Northeastern Region, an Office was established in Wawa in January, 1987 and D.J.J. Tortosa was appointed Resident Geologist.

H. Lovell, formerly Resident Geologist at Kirkland Lake was appointed Regional Staff Geologist, to begin work on a study of gold deposits in the Matachewan Kirkland Lake–Larder Lake area. G. Grabowski served as Acting Resident Geologist until year-end when G. Meyer was appointed Resident Geologist.

Following the secondment of W.O. Mackasey, Resident Geologist, Porcupine North, to the provincial mining hazards program, the Porcupine South Resident Geologist assumed duties both for his own area and Porcupine North.

In the Southern Ontarrio Region, H.D. Meyn, formerly Resident Geologist at Bancroft, was appointed Regional Specialist. Responsibility for his area has been assumed by the Southeastern Ontario Resident Geologist, in Tweed. B.H. Feenstra has been appointed Resident Geologist for the Southwestern Ontario Area, and is stationed in London.

Drill core storage facilities were operative in seven centres, including Kirkland Lake, Timmins, Sault Ste. Marie, Bancroft, Tweed, Thunder Bay, and Kenora. A core collection and cataloguing program developed by the Resident Geologists' staff at these centres has ensured that as much as possible of the available diamond-drill core is collected and stored.

C.R. Kustra
Regional Liaison Geologist
Ontario Geological Survey

Errata

KENORA

Figure 1.4 is referred to in the text as Figure 1.5.

Figure 1.5 is referred to in the text as Figure 1.4.

The list of mineral properties attached to Figure 1.4 belongs with Figure 1.5.

RED LAKE

Figure 2.2 is referred to in the text as Figure 2.3.

Figure 2.3 is referred to in the text as Figure 2.2.

The scale of Figure 2.2 is 1 inch to 7.6 miles.

THUNDER BAY

On page 92, Point 4., veins "from 10 to 100 m wide" should be "from 10 to 100 cm wide".

WAWA

On page 175, "MacCleod Mine" should be "McLeod Mine".

On page 177, R.C. Stewart is in the Wawa office.

On page 194, under Precambrian Geology Section, "Killings" Township should be "Killins" Township.

PORCUPINE

In Figure 10.1f, only the producing mines numbered 5, 6 and 7 belong to Giant Yellowknife Mines.

"Pamarex" (No. 29) should be "Pamorex".

In Table 10.3, Hoyle Pond Mine production is for 1985 to present.

On page 225, "frill bays" should read "drill bays".

On page 225, "Angle-Porcupine" should read "Anglo-Porcupine".

On page 235, the Maskevich Property is in Keith Township.

On page 243, Cominco has a talc deposit in the west-central part of Shaw Township, not the east-central part.

KIRKLAND LAKE

On page 274, "multiple, alternate, and property names." should be "multiple property names, where required."

In Table 11.4, all lengths are in metres.

TWEED

In Figure 15.3, the enclosed areas mark the limits of government projects within the map area; the numbers refer to Table 15.7.

LONDON

In Figure 16.2, DMPL refers to the Upper Devonian - Lower Mississippian Port Lampton Group.

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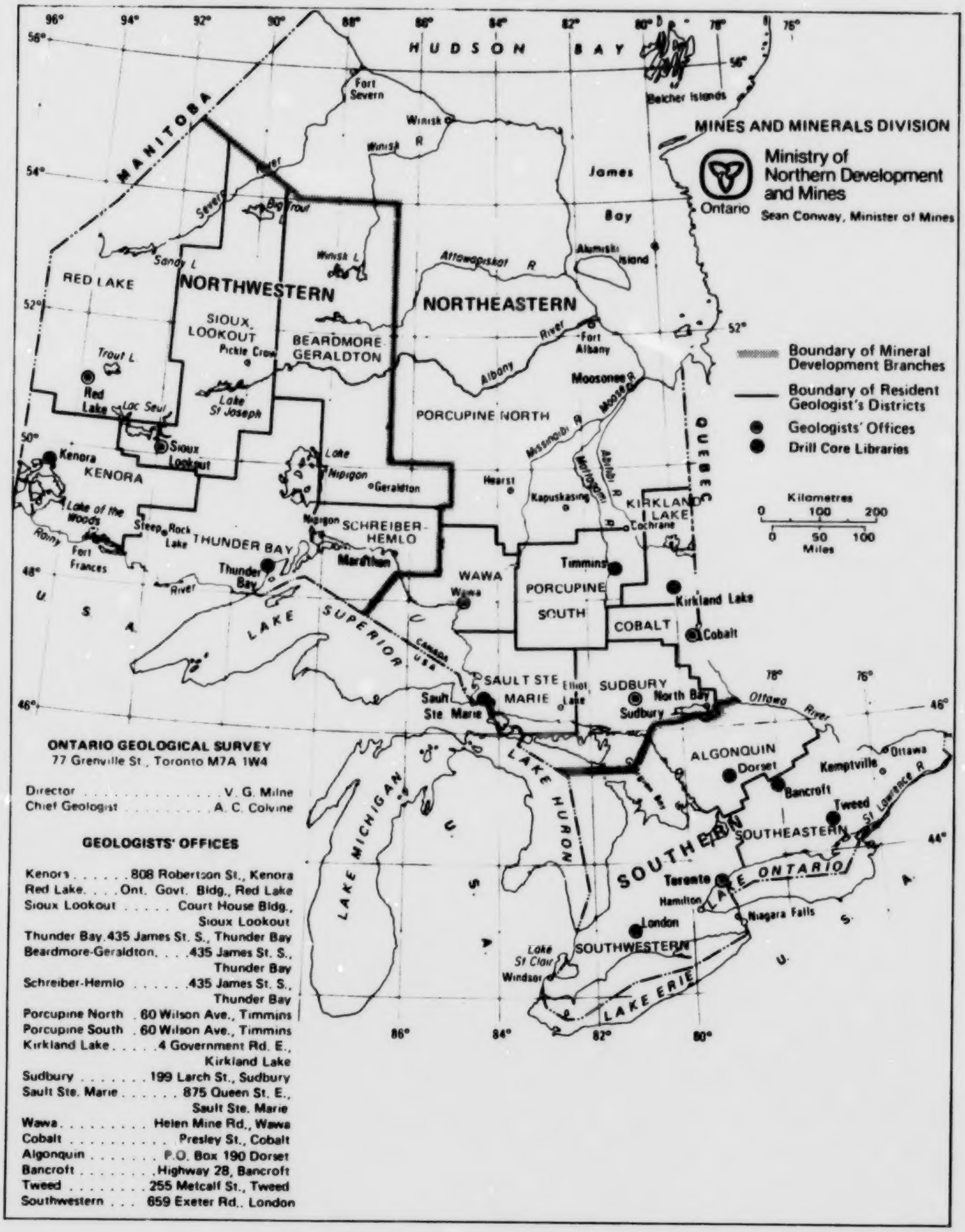

HUDSON BAY
Belcher Islands
Fort Severn
Winisk
Winisk R
MANITOBA
Severn River
Big Trout L
Sandy L
Winisk L
Attawapiskat R
James Bay
Akimiski Island
RED LAKE
NORTHWESTERN
SIOUX LOOKOUT
Pickle Crow
BEARDMORE GERALDTON
NORTHEASTERN
Albany River
Fort Albany
Trout L
Red Lake
Lac Seul
Lake St Joseph
Sioux Lookout
Moosonee
Moose R
PORCUPINE NORTH
QUEBEC
Kenora
KENORA
Lake Nipigon
Geraldton
Hearst
Kapuskasing
Missinaibi R
Mattagami R
Abitibi R
KIRKLAND LAKE
Cochrane
Lake of the Woods
Rainy River
Fort Frances
Steep Rock Lake
THUNDER BAY
Nipigon
SCHREIBER-HEMLO
Marathon
Thunder Bay
WAWA
Wawa
Timmins
PORCUPINE SOUTH
Kirkland Lake
U.S.A.
LAKE SUPERIOR
Canada USA
COBALT
Cobalt
SAULT STE MARIE
Sault Ste Marie
Elliot Lake
SUDBURY
Sudbury
North Bay
Ottawa River
ALGONQUIN
Dorset
Bancroft
Kemptville
Ottawa
Tweed
SOUTHEASTERN
St Lawrence R
LAKE MICHIGAN
LAKE HURON
Georgian Bay
SOUTHERN
Toronto
LAKE ONTARIO
Hamilton
Niagara Falls
London
SOUTHWESTERN
Lake St Clair
Windsor
LAKE ERIE
U.S.A.
96° 94° 92° 90° 88° 86° 84° 82° 80° 78° 76°
56° 54° 52° 50° 48° 46° 44°
Boundary of Mineral Development Branches
Boundary of Resident Geologist's Districts
Geologists' Offices
Drill Core Libraries
Kilometres
0 100 200
0 50 100
Miles

MINES AND MINERALS DIVISION

Ministry of
Northern Development
and Mines
Ontario

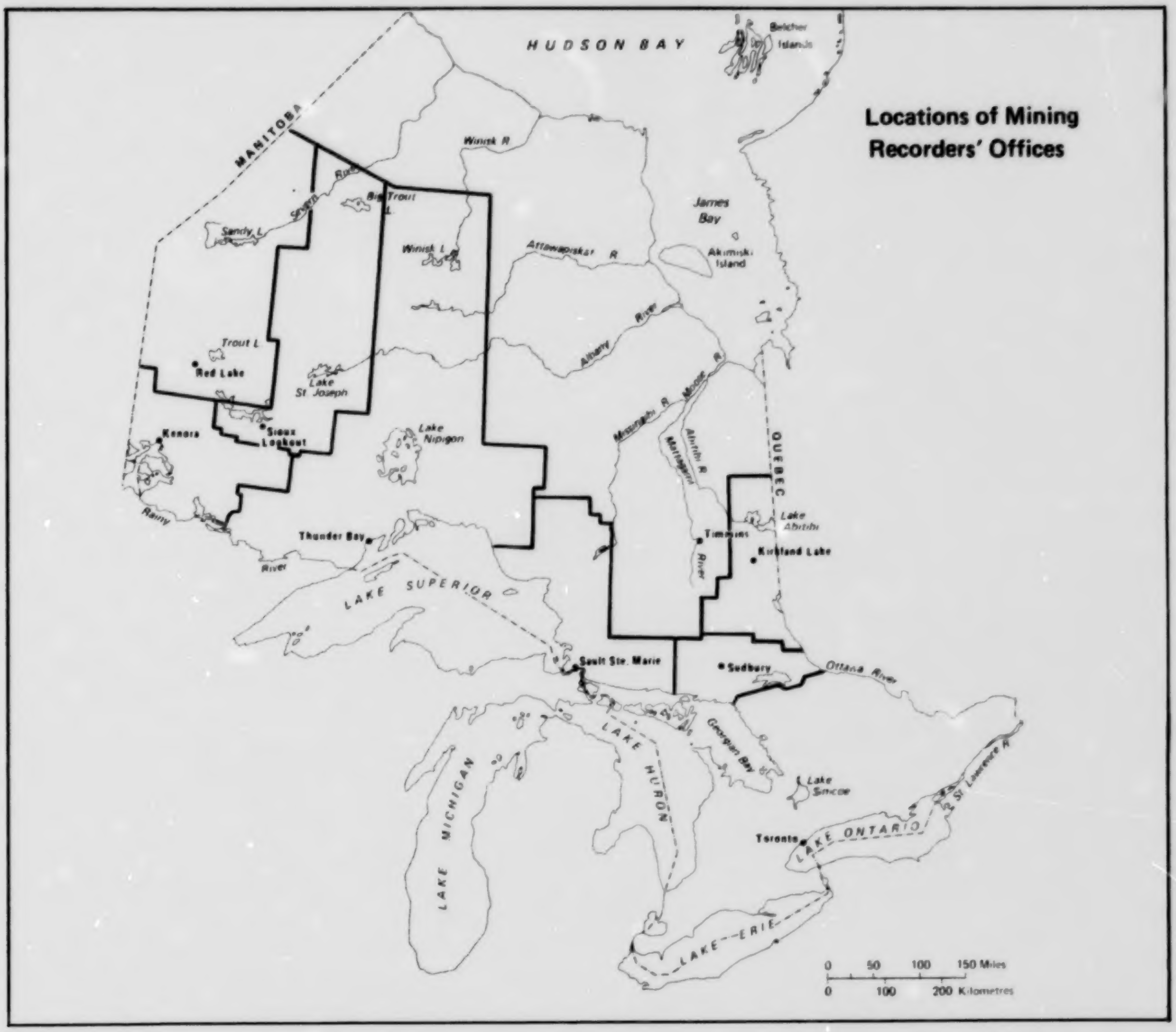
Sean Conway, Minister of Mines

ONTARIO GEOLOGICAL SURVEY
77 Grenville St., Toronto M7A 1W4

Director . . . . V. G. Milne
Chief Geologist . . . . A. C. Colvine

GEOLOGISTS' OFFICES

Kenora	808 Robertson St., Kenora
Red Lake	Ont. Govt. Bldg., Red Lake
Sioux Lookout	Court House Bldg., Sioux Lookout
Thunder Bay	435 James St. S., Thunder Bay
Beardmore-Geraldton	435 James St. S., Thunder Bay
Schreiber-Hemlo	435 James St. S., Thunder Bay
Porcupine North	60 Wilson Ave., Timmins
Porcupine South	60 Wilson Ave., Timmins
Kirkland Lake	4 Government Rd. E., Kirkland Lake
Sudbury	199 Larch St., Sudbury
Sault Ste. Marie	875 Queen St. E., Sault Ste. Marie
Wawa	Helen Mine Rd., Wawa
Cobalt	Presley St., Cobalt
Algonquin	P.O. Box 190 Dorset
Bancroft	Highway 28, Bancroft
Tweed	255 Metcalf St., Tweed
Southwestern	659 Exeter Rd., London



Locations of Mining Recorders' Offices

HUDSON BAY
Belcher Islands
MANITOBA
Winisk R.
Severn River
Big Trout L.
Sandy L.
Winisk L.
Attawapiskat R.
James Bay
Akimiski Island
Albany River
Moose R.
Trout L.
Red Lake
Lake St. Joseph
Kenora
Sioux Lookout
Lake Nipigon
Missinaibi R.
Abitibi R.
Mattagami
QUEBEC
Lake Abitibi
Timmins
River
Kirkland Lake
Rainy River
Thunder Bay
LAKE SUPERIOR
Sault Ste. Marie
Sudbury
Ottawa River
LAKE HURON
Georgian Bay
Lake Simcoe
St. Lawrence R.
LAKE MICHIGAN
Toronto
LAKE ONTARIO
LAKE ERIE
0 50 100 150 Miles
0 100 200 Kilometres

MINING DIVISION	MINING RECORDER	ADDRESS	TELEPHONE
Red Lake	R.Majcher	P.O. Box 324 Red Lake P0V 2M0	(807) 727 - 3284
Kenora	A.S.Rivett	808 Robertson St. Box 5050 Kenora P9N 3X9	(807) 468 - 9841
Patricia	R.Spooner	Court House Sioux Lookout P0V 2T0	(807) 737 - 2034
Thunder Bay	A.Hayes	435 James St. South Thunder Bay P7C 5G6	(807) 475 - 1311
Sault Ste Marie	S.T.Lessard	875 Queen St. East Sault Ste Marie P6A 2B3	(705) 949 - 1231
Porcupine	G.White	60 Wilson Avenue Timmins P4N 2S7	(705) 267 - 1401
Sudbury	V.C.Miller	199 Larch St. Sudbury P3E 5P9	(705) 675 - 4120
Larder Lake	M.A.Weirmeir	4 Goverment Rd. E Kirkland Lake P2N 1A2	(705) 567 - 9242
Southern Ontario	R.M.Charnesky	10 Wellesley St. E Toronto M4Y 1G2	(416) 965 - 1322

CONVERSION FACTORS FOR MEASUREMENTS IN ONTARIO GEOLOGICAL SURVEY PUBLICATIONS.

CONVERSION FROM SI TO IMPERIAL			CONVERSION FROM IMPERIAL TO SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm^3	0.061 02	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.308 0	cubic yards	1 cubic yard	0.764 555	m^3
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.103 311	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 908 8**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight perton (short)	0.05	ounces (troy) per ton (short)

Note. Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in cooperation with the Coal Association of Canada.

Report of Activities
1987
Regional and Resident Geologists

---

edited by
C.R. Kustra[1]

[1] Regional Liason Geologist, Ontario Geological Survey.

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1. Kenora Resident Geologist's Area—1987

C.E. Blackburn[1], **M.R. Hailstone**[2], **J. Parker**[3], **and C.C. Storey**[4]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[3]Project Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[4]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Kenora

INTRODUCTION

Current permanent staff in the Resident Geologist's Office include C.E. Blackburn, Resident Geologist; M.R. Hailstone, Staff Geologist; C.C. Storey, Drill Core Library Geologist; C.B. Ravnaas, Drill Core Library Geological Assistant; and Marge Guderyan, Secretary. Contract staff during 1987 comprised the following people: Susan Turner and Joelle Reishel, Clerk-Typists; Mark Perrault and Teresa Engler, Geological Assistants; Jack Parker, Project Geologist in the Dryden–Ignace area; assisted successively by R. Schienbein, A. Schottroff; and G. Vogg, who prepared Geological Data Inventory Folios, assisted by Sheila Reid.

RESIDENT GEOLOGIST'S OFFICE STAFF ACTIVITIES

The two programs of underground development, at the Duport Mine, Shoal Lake, where Consolidated Professor Mines Limited was conducting further drifting and underground diamond drilling, and at the joint venture operation of Echo Bay Mines Limited and Nuinsco Resources Limited, at Cameron Lake, were visited on a number of occasions in the year.

Numerous properties and areas undergoing active exploration were visited during the year:

> Camine Resources and G.M.L. Consulting Ltd.'s options on the Alto–Gardnar and Rivers Option gold prospects in MacFie Township where they did geological mapping, geophysical surveys, stripping, and sampling;
>
> International Platinum Corporation's options from A. Kozowy, on the Brockman gold prospect in the Tabor Lake area, and the Church Lake and New Church Lake gold occurrences in the Kawashegamuk Lake area, where they did geological mapping, stripping and sampling;
>
> Mistango Resources' option from D. Petrunka on the Calder–Bousquet gold occurrence in Laval Township, where a drilling program was conducted;
>
> gold prospects and occurrences optioned by Comaplex Resources from Stan and Sherridon Johnson, including the E.D.B.-1 Prospect and Johnson Occurrence in the Contact Bay area, and the Moose Bay Prospect and Whitewater Lake Occurrences in the Turtlepond Lake area, on which they did sampling and prospecting;
>
> the Flambeau Lake Gold Prospect of A. Kozowy, in Aubrey Township, on which Falconbridge Limited continued a prospecting and geophysical survey program;
>
> the Vanlas Prospect and Glatz Pritchard Lake Occurrence in Van Horne Township, where Van Horne Gold Exploration Limited conducted a diamond-drill program for gold;
>
> the W.W. Smith gold prospect in the Buchan Bay area, where Noranda commenced a program of sampling;
>
> the Sweden and Gordon gold occurrences, where G. Clark, J. Doty, and J. Karwacki carried out a stripping and sampling program;
>
> the Port Arthur Copper Mine and Mathieu copper-zinc occurrence, in the Little Turtle Lake area, where Minnova Inc. conducted diamond drilling, stripping, geological mapping, and geochemical and geophysical surveys, as part of a larger program;
>
> the Geroux gold occurrence, and copper occurrences at Squaw Lake, on which Teeshin Resources Limited conducted reconnaissance geological mapping, and soil geochemistry surveys;
>
> the Jensen–Johnston or Bag Lake gold occurrence in the Dogpaw Lake area, where Granges Exploration Limited conducted geological mapping, geophysical surveys, stripping and sampling;
>
> the Electrum Lake gold prospect in Ewart Township, where Laramide Resources Limited carried out a program of stripping and sampling;
>
> the Gold Mountain gold prospect, in the Wiley Bay area, where Canadian Nickel Company continued a program of stripping and sampling;
>
> the Radio-Active Minerals Limited, Quebec Nickel Corporation, and Frederick Mining and Development base-metal (copper-nickel) occurrences, in the Rex Lake area, where Falconbridge Limited and International Platinum Corporation, in two separate ventures, are exploring their platinum potential;
>
> the Scramble gold prospect, in Jaffray Township, where joint venture partners Boise Minerals and Madeleine Mines Limited were commencing a program of development; and
>
> the AL104 and AL105 gold occurrences in the Bad Vermillion Lake area, where Orofino Resources Limited was conducting a program of geophysical surveys, stripping and trenching, and diamond drilling.

Other prospects under evaluation, and inactive mineral showings were examined and reported on during the year. Operating mines and projects at advanced stages of development outside of Kenora Mining Division that were visited included Campbell Red Lake Mine, A.W. White Mine, and St. Joe Canada Incorporated's Golden Patricia project.

During the summer months, M.R. Hailstone manned a temporary office at the Fort Frances Northern

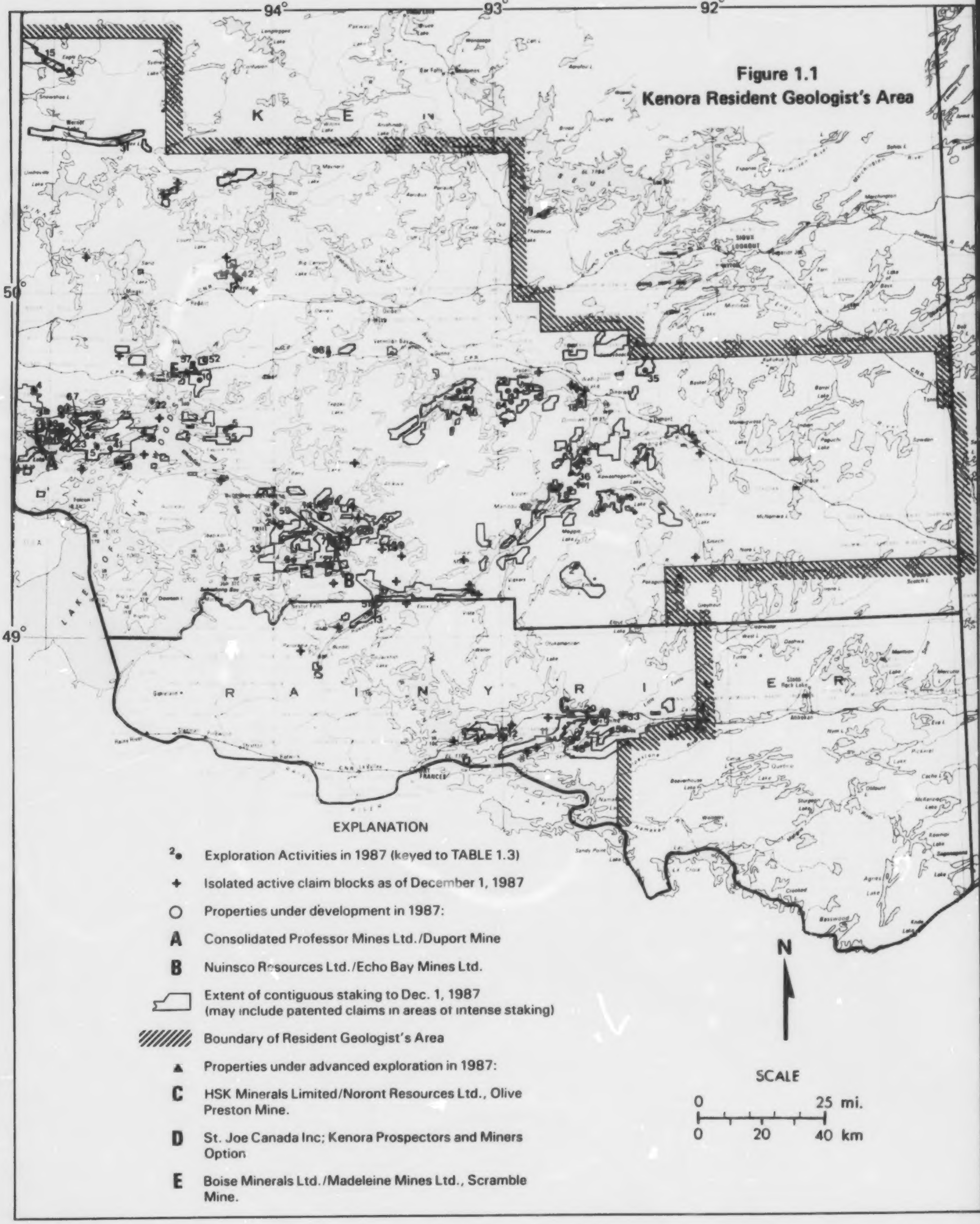


Figure 1.1
Kenora Resident Geologist's Area

EXPLANATION

- ^{2}● Exploration Activities in 1987 (keyed to TABLE 1.3)
- ✚ Isolated active claim blocks as of December 1, 1987
- ○ Properties under development in 1987:
- **A** Consolidated Professor Mines Ltd./Duport Mine
- **B** Nuinsco Resources Ltd./Echo Bay Mines Ltd.
- ▭ Extent of contiguous staking to Dec. 1, 1987 (may include patented claims in areas of intense staking)
- ▨ Boundary of Resident Geologist's Area
- ▲ Properties under advanced exploration in 1987:
- **C** HSK Minerals Limited/Noront Resources Ltd., Olive Preston Mine.
- **D** St. Joe Canada Inc; Kenora Prospectors and Miners Option
- **E** Boise Minerals Ltd./Madeleine Mines Ltd., Scramble Mine.

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 1.1

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1987	5,211	2,578	12,496	86,321	153,077	12,067	251,465
1986	4,041	5,054	9,863	64,099	47,883	9,698	144,837
1985	2,216	5,195	10,875	55,090	185,148	29,765	292,729
1984	3,261	3,042	13,854	36,055	281,359	23,670	364,692
1983	11,061	1,472	13,635	35,746	42,221	12,006	106,397
1982	1,579	1,609	4,046	23,525	26,270	5,330	68,439
1981	2,121	846	4,076	26,127	37,624	3,383	72,732
1980	1,877	788	3,208	15,428	3,149	859	21,368
1979	984	1,357	2,119	9,992	10,658	1,420	24,182
1978	808	1,357	2,300	22,299	7,576	2,143	34,934
1977	1,495	1,585	2,820	15,405	11,366	1,760	33,838
1976	1,380	2,125	3,234	25,030	21,367	5,960	55,042
1975	1,677	2,452	3,975	23,584	31,509	940	57,266
1974	2,653	1,076	4,727	29,496	18,049	3,070	52,134

Development Officer's facilities, providing a service to local prospectors and mineral industry personnel. This was established on an experimental basis, to assess the need for this kind of service.

J. Parker conducted a mapping project in the Fornieri Bay–Hardrock Bay area, Eagle Lake. This project, at a scale of 1 inch to 400 feet, similar in scope to the Flambeau Lake–Larson Bay project completed in 1986, was conducted to provide a better understanding of controls on gold mineralization in an area that has undergone considerable exploration for this commodity since the 1900s. Results of this mapping were displayed as Open File Map 103 in December at the Annual Ontario Geological Survey (OGS) Geoscience Research Seminar and Open House in Toronto.

Sixteen Geological Data Inventory Folios were completed in 1987, bringing the total to 25 since commencement of the project in 1985.

J. Parker completed the first draft of an Open File Report summarizing results of the Economic Geologist program in the Dryden–Ignace area, conducted by him during the period 1984 to 1987.

Office staff participated in two geoscience seminars organized by the Northwestern Region, Mines and Minerals Division, held in Thunder Bay and Kenora, February 10 and 11, and February 24 and 25, respectively.

The Kenora Drill Core Library, serving the combined Kenora, Red Lake, and Patricia Mining Divisions, was fully active in 1987; by the end of November, 29 750 m of completely catalogued core was housed in the facility.

In addition to specialized field trips for mineral industry and government geologists, trips were provided for Churchill High School, of Winnipeg, for the Dryden High School Conservation Course, and for the Annual Meeting of the Outdoor Writers of Canada. A talk on current mineral industry activity in the Kenora area was presented to the Kenora Rotary Club.

Office staff attended the annual meetings of the Prospectors and Developers Association, and the OGS Geoscience Research Seminar, both in Toronto, the Geological Association of Canada Annual Meeting in Saskatoon, and the Institute on Lake Superior Geology Annual Meeting in Wawa.

MINING ACTIVITY

Underground development continued at the Duport Mine, Shoal Lake, gold property of Consolidated Professor Mines Limited in 1987. Prior to 1987, initial major underground development had been conducted in 1984 with the driving of a decline from Stevens Island, with work conducted down to the 530-foot level, in a joint venture with Union Carbide Corporation. Following a period of little activity in 1985, surface diamond drilling was conducted in early 1986, mainly testing the northern extension of the Main Zone, with funding from Umetco Minerals, a subsidiary of Union Carbide Corporation, and an Ontario Mineral Exploration Program (OMEP) grant. In July, 1986, reserve estimates of 1.51 million tons grading 0.34 ounce gold per ton for an average width of 8.2 feet were announced. Subsequently, Conwest Exploration Company Limited and other investors injected further finances amounting to $4.5 million through flow-through and ordinary shares, resulting in a surface drilling program, and an underground program of drifting and diamond drilling, that commenced in late 1986.

In early 1987, work was proceeding to drive the decline a further 1100 feet to the 660-foot level, and the establishment of two new hanging wall drifts, at 400 and 660 feet, to provide stations for underground drilling, mainly on the northern extension of the Main and East Zones.

Concomitantly, surface drilling tested the northern extension of the Main and East Zones to a depth of 1500 feet, to guide and supplement the underground work.

TABLE 1.2. MAPS AND REPORTS PERTAINING TO THE KENORA RESIDENT GEOLOGIST'S AREA, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1987

Airborne Electromagnetic and Magnetic Survey

Maps 80 953 to 81 002

Colour Maps

Map 2443 (Reprint)
Map 2505
Map 2506
Map 2518

Open File Reports

OFR 5626
OFR 5632
OFR 5638
OFR 5645
OFR 5659
OFR 5664

Preliminary Maps Geological Series

P.3065
P.3068
P.3069
P.3070
P.3075
P.3076
P.3084
P.3085
P.3100

Mineral Deposits Circular

MDC 26

Miscellaneous Papers

MP 77 1978 - 1986 Supplement
MP 134
MP 137

Geological Data Inventory Folios

GDIF 341
GDIF 359
GDIF 395
GDIF 396
GDIF 397
GDIF 398
GDIF 391
GDIF 392
GDIF 393
GDIF 394

Open File Maps

OFM 73
OFM 74
OFM 75
OFM 76
OFM 77
OFM 78
OFM 103

In a report to shareholders, March 10, 1987, it was announced that 24 short holes totalling 3853 feet had been drilled from the 325- and 300-foot levels, testing selected areas of the East and Main Zones between the 250- and 550-foot levels. On surface, 22 holes had been completed for a total of 16 500 feet. Known reserves extended for a strike length of 3100 feet. An important result of the new drilling was the discovery of four, parallel, gold-bearing zones at the north end of the Main Zone, extending to a depth of 1350 feet.

April 8, 1987, in a subsequent press release, it was announced that two deep holes beneath the Northern Zone cut 0.66 ounce gold per ton over 5.8 feet, and 0.35 ounce gold per ton over 11.0 feet, at depths of 1440 and 1600 feet. On August 8, 1987, a report to shareholders indicated that at the close of this drill program, 150 underground holes had been diamond drilled, totalling 45 000 feet, with an additional 32 drilled from surface. The drilling had indicated a steep plunge of the Main Zone to the north, with continuity to depths of at least 1600 feet.

Later in the year, engineering feasibility studies were underway to confirm ore reserves and prepare capital and operating cost estimates. Further funding to the amount of $1.5 million was being raised by issuance of flow-through shares to MVP Exploration (1987) and Co., Limited Partnership.

G.R. Cunningham-Dunlop, President, Consolidated Professor Mines Limited (personal communication, November 1987) confirms that new reserve estimates calculated by A.C. Troop, consultant geologist for Consolidated Professor, are 1 879 000 tons grading 0.36 ounce gold per ton. Of this, proven reserves are 113 000 tons grading 0.41 ounce gold per ton. Tests on a 100-ton bulk sample have indicated free-milling gold to constitute between 30 to 35 percent of total gold content. Mr. Dunlop also indicated that as many as seven parallel gold-bearing zones had subsequently been identified at the north end of the Main Zone.

Nuinsco Resources Limited, following a long period of exploration on its Cameron Lake gold property that started in 1981, and has continued since 1985, with joint venture partner Echo Bay Mines Limited, commenced work in late 1986, on the driving of a decline ramp. Funded by Echo Bay Mines Limited by the purchase of flow-through shares, at a cost of $3.6 million, the ramp was to be driven 2700 feet to the 425-foot level, in the first phase of a program of underground exploration.

Prior to commencement of the underground project, latest drill-indicated reserve calculations, announced in a press release dated January 20, 1986, were 1 625 000 tons grading 0.16 ounce gold per ton, to a depth of 1100 feet, of which 1 000 000 tons graded 0.23 ounce gold per ton, including a higher grade component of 516 000 tons grading 0.258 ounce gold per ton. Toward the end of May, it was announced (The Northern Miner, May 25, 1987) that the ramp design had been changed so that a 20 000-foot diamond-drilling program could be done from the 365-foot rather than the 425-foot level. August 17, 1987, in a report to shareholders it was announced that about 1200 feet of drifting and crosscutting had tested the entire length of the alteration zone, and that 18 237 feet of diamond drilling had tested three separate gold zones. Considerable free gold had been observed in the drifting.

In a press release of September 15, 1987, Nuinsco Resources announced the decision to go to the second stage of underground exploration at a cost of $6.75 million, with funding provided entirely by Echo Bay Mines Limited by purchase of flow-through shares. This work, which commenced in mid-November, is designed to extend the ramp to the 750-foot level, with exploration drifts at various levels to establish drill stations to test the deposit down to about 1600 feet.

Metallurgical studies on an 800-pound bulk sample of ore from the 365-foot level assayed 0.222 ounce gold per ton, and indicated recovery of at least 92 percent of the gold.

EXPLORATION ACTIVITY

The general pattern of exploration that has prevailed since 1983, continued in the Kenora Mining Division with gold being the major target. Geographically the search is concentrated in four major areas: Kakagi–Rowan Lake; Lake of the Woods–Shoal Lake; Manitou–Wabigoon–Eagle Lakes; and Fort Frances–Mine Centre. Some interest was evident in the Bee Lake area in the northwest portion of the Division, across the border from the currently active Rice Lake greenstone belt in Manitoba.

The current interest in platinum was reflected in exploration programs in various mafic to ultramafic intrusions thoughout the Division, notably at Rex Lake, 50 km north of Kenora, and at Entwine Lake, about 60 km south of Dryden.

Base-metal exploration remained at a low ebb, with only one active program in 1987, in the Fort Frances–Mine Centre area.

GOLD

Kakagi–Rowan Lakes Area

The decision by Echo Bay Mines Limited to go underground on Nuinsco's Cameron Lake gold property led to curtailment of further surface exploration activity in 1987 on Nuinsco's other gold prospects in the vicinity of Sullivan Bay, Rowan Lake. However, a number of other companies continued work on their properties in the general Rowan Lake area. Some of these are on strike with, or closely parallel to either the Cameron Lake Property or the Monte Cristo group of prospects, namely: International Platinum Corporation in its joint venture with Del Norte Chrome Corporation; Pacific Seadrift Mining Limited; Equinox Resources Ltd. and joint venture partner Technigen Platinum Corporation; Canadian Nickel Company Limited; Sherritt Gordon Mines Limited; Dubenski Gold Mines Limited; and Nucanolan Resources Limited.

International Platinum Corporation, as operator in its joint venture with Del Norte Chrome Corporation, continued exploration on its Sullivan Bay property, between Nuinsco Resources Limited's option from Tantalus Resources, and their Monte Cristo Property. A 3000-foot winter diamond-drill program was begun in February, 1987, following basal till drilling, in cooperation with Nuinsco. Eighteen holes of the 67 drilled on International Platinum Corporation's ground returned visible gold in heavy mineral separates, with values greater than 800 ppb gold (George Cross News Letter, February 6, 1987). Drilling continued into the summer months, with a 7000-foot, 16-hole, diamond-drill program, testing four targets, completed in September (George Cross News Letter, September 15, 1987). At that time, further drilling was announced as being underway.

Pacific Seadrift Mining Limited conducted diamond drilling on its property at Rowan Lake, immediately east of Nuinsco Resources' Monte Cristo Property. Nine diamond-drill holes, for a total of 5090 feet, were put down to test the extension of the Monte Cristo gold-bearing zone (Assessment Files, Resident Geologist's Office, Kenora).

Equinox Resources Limited and joint venture partner Technigen Platinum Corporation conducted magnetic and very low frequency electromagnetic (VLF-EM) surveys on their ground at Beggs Lake, immediately north of Nuinsco's Cameron Lake Property. The work was recorded in the name of J. Langelaar and R. Van Enk (Assessment Files, Resident Geologist's Office, Kenora).

Canadian Nickel Company Limited conducted electromagnetic, magnetic, and radiometric surveys over claims immediately west and north of Nuinsco's Cameron Lake Property. Whereas the electromagnetic and magnetic surveys outlined a number of geological features, the radiometric survey gave readings well within background levels. (Assessment Files, Resident Geologist's Office, Kenora). Sherritt Gordon Mines Limited diamond drilled four holes on its Flint Lake Property, along the Pipestone–Cameron Fault, west of Cameron Lake. Assay values from all four holes indicated only trace amounts of gold (Assessment Files, Resident Geologist's Office, Kenora).

Dubenski Gold Mines Limited continued a diamond-drill program on ground brought to lease at Flint Lake, on the Caswell–Williams prospect.

Nucanolan Resources Limited did a limited amount of work on their ground adjoining, and to the east of, Nuinsco Resources' Cameron Lake Property. Two packsack diamond-drill holes were put down, for a total of 173 feet (Assessment Files, Resident Geologist's Office, Kenora).

Other individuals that did work in the general Kakagi–Rowan Lake area include G. LaFleche, who did geological and geophysical surveys, and stripping, at Cedar Tree Lake, in the Dogpaw Lake area; R. Claggett, who did stripping at Hill Lake, in the Lawrence Lake area; and D. Doal, under whose name

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 1.3

Number on Figure	Individual or Company	Activity
1	Abermain Corporation	Geological and Geochemical Surveys, Boyer Lake Area
2	BP Resources Canada Limited	Airborne Geophysical Survey, Eagle Rock Lake Area
3	Brown, J., Fransoo, R.	Geophysical Survey, Ewart Township
4	Busch, David J.	Stripping and Sampling, Ewart Township
5	Canadian Nickel Company Ltd.	Geophysical Survey, Code Township; Airborne Geophysical Survey, Wiley Bay Area
6	Canadian Nickel Company Ltd.	Diamond Drilling, Heronry Lake Area
7	Canadian Nickel Company Ltd.	Geophysical Surveys, Dogpaw Lake and Rowan Lake Areas
8	Canamerican Precious Metals Inc.	Diamond Drilling, Boyer Lake Area
9	Claggett, Robert A.	Stripping, Lawrence Lake Area
10	Clark, G.H., Karwacki, J., Doty, J.	Stripping and Geophysical Survey, Haycock Township
11	Corporation Falconbridge Copper	Diamond Drilling, Bliss Lake Area
12	Cousineau, Louis	Stripping, Halkirk Township
13	Cummings, Walter M.	Geological and Geochemical Surveys, Dash Lake Area
14	Doal, D.R.	Airborne Geophysical Survey, Dogpaw Lake Area
15	Dome Exploration (Canada) Limited	Geophysical Survey, Rickaby Lake Area
16	Esso Minerals Canada	Diamond Drilling, Kawashegamuk Lake Area
17	Fairservice, Robert J.	Geophysical Survey, Lobstick Bay Area
18	Fairservice, Robert J.	Diamond Drilling, Butler Lake Area
19	Falconbridge Limited	Diamond Drilling and Geochemical Survey, Boyer Lake Area
20	Federal Kirkland Mines Ltd.	Stripping, Little Turtle Lake Area
21	Frances Resources Ltd., Laramide Resources Ltd.	Geophysical Survey, Brooks Lake Area
22	Gold Hill Resources Ltd.	Diamond Drilling and Geophysical Survey, Clearwater Bay Area
23	Golden Rule Resources Ltd.	Diamond Drilling, Shoal Lake Area
24	Granges Exploration Ltd.	Stripping, Tweedsmuir Township
25	Homestake Mineral Development Company	Geological Survey, Clearwater Bay Area
26	International Platinum Corp.	Diamond Drilling, Rowan Lake Area
27	International Platinum Corp.	Geophysical Surveys, Aubrey Township
28	Johnson, Stan C.	Geological Survey, Turtlepond Lake Area
29	Kidd Creek Mines Ltd.	Geophysical and Geological Surveys, Aubrey Township
30	Kidd Creek Mines Ltd.	Geochemical and Geological Surveys, Contact Bay Area
31	Knappett, Rod	Geological Survey, Rex Lake Area
32	Kroocmo, David M.	Stripping, Factor Lake Area
33	LaFleche, Gerald	Geophysical and Geological Surveys and Stripping, Dogpaw Lake Area
34	Langelaar, J., Van Enk, R.	Geophysical Survey, Rowan Lake Area
35	Loydex Resources Inc.	Airborne Geophysical Survey, MacFie Township
36	McAteer, W.	Stripping, Boyer Lake Area
37	McChip Jascan Joint Venture	Diamond Drilling and Geological Survey, Dash Lake Area
38	Midnapore 1979 Resources Inc.	Airborne Geophysical Survey, Wiley Bay Area
39	Mine Centre Gold Venture Inc.	Diamond Drilling and Geophysical Survey, Bad Vermilion Lake Area
40	Morrison, William F.	Airborne Geophysical Survey, Shoal Lake Area
41	Mountain Lake Resources Inc.	Airborne Geophysical Survey and Diamond Drilling, Wiley Bay Area
42	Nelson, Carter	Stripping, Wonderland Lake Area
43	Noranda Exploration Co. Ltd.	Geophysical and Geochemical Surveys, Shoal Lake Area
44	Noranda Exploration Co. Ltd.	Geological and Geochemical Surveys, Echo Bay Area
45	Noranda Exploration Co. Ltd.	Geophysical Survey, Meggisi Lake Area
46	Noranda Exploration Co. Ltd.	Geological Survey and Stripping, Buchan Bay Area
47	Nucanolan Resources Ltd.	Diamond Drilling, Rowan Lake Area
48	Orofino Resources Limited	Geophysical and Geochemical Surveys, Bad Vermilion Lake Area
49	P.I.R.P. Holdings Inc.	Airborne Geophysical Survey, Bad Vermilion Lake Area
50	Pacific Seadrift Mining Ltd.	Diamond Drilling, Rowan Lake Area
51	Pitkanen, R. W.	Stripping, Dash Lake Area
52	Pogson, Gordon	Stripping and Trenching, Haycock Township
53	Redden, J.W.	Geophysical Survey, Bennett Lake
54	Redden, J.W.	Geological Report, Tabor Lake Area
55	Roberecki, Ed	Stripping, Code Township
56	Roberecki, Ed	Stripping, Echo Bay Area
57	Scramble Mining Limited	Geochemical and Geophysical Surveys, Jaffray Township
58	Seine River Resources Inc.	Airborne Geophysical Survey, Bad Vermilion Lake Area

TABLE 1.3 Continued

Number on Figure	Individual or Company	Activity
59	Sherritt Gordon Mines Ltd.	Diamond Drilling, Dogpaw Lake Area
60	St. Joe Canada Inc	Geological Survey, Echo Bay Area
61	St. Joe Canada Inc.	Diamond Drilling and Geological Survey, Shoal Lake Area
62	St. Joe Canada Inc.	Diamond Drilling, Lower Manitou Lake Area
63	St. Joe Canada Inc.	Geological and Geophysical Surveys, Turtlepond Lake Area
64	St. Joe Canada Inc.	Geological Survey, Contact Bay Area
65	Starr, Eugene	Trenching, Turtlepond Lake Area
66	Thibault, Douglas	Stripping, Tustin Township
67	Voyager Exploration Ltd.	Geophysical Survey, Echo Bay Area

airborne geophysical survey work was applied to claims at Caviar Lake, in the Dogpaw Lake area.

Canadian Nickel Company Limited continued exploration on their Penn gold property at Kakagi Lake, in a joint venture with Fort Knox Gold Resources, in the Heronry Lake area. Six holes were diamond drilled for a total of 4082 feet, and low, but anomalous, gold values reported (Assessment Files, Resident Geologist's Office, Kenora).

Frances Resources Limited and Laramide Resources Ltd. conducted magnetic, electromagnetic, and induced polarization surveys on their East Kakagi Lake gold property in the Brooks Lake area (Assessment Files, Resident Geologist's Office, Kenora).

Granges Exploration Limited commenced an exploration program of surface stripping on the Jensen–Johnston gold occurrence, south of Sioux Narrows in Tweedsmuir Township (Assessment Files, Resident Geologist's Office, Kenora).

Tanqueray Resources Limited conducted a program of magnetic and VLF-EM surveys on claims optioned from R. Fairservice, on the north shore of Caviar Lake, in the Lobstick Bay area (Assessment Files, Resident Geologist's Office, Kenora).

Further south, in the Dash Lake area, three parties conducted work adjacent to Pipestone Lake. These were McChip Resources, in a joint venture with Jascan Resources Inc., who did a geological survey and diamond drilling; W. Cummings, who conducted geological and geochemical surveys; and R. Pitkanen, who carried out surface stripping.

Lake of the Woods–Shoal Lake Area

St. Joe Gold Corporation continued an exploration program in the Shoal Lake area , mostly on patented ground that includes the past-producing Mikado and Cedar Island (Cornucopia) Mines among other gold prospects, held under an option agreement with Kenora Prospectors and Miners. According to an article in The Northern Miner, November 30, 1987, results from an 18 440 m diamond-drill program had enabled the company to outline drill-indicated reserves of 863 500 tons grading 0.25 ounce gold per ton over an average true width of 5.5 feet. The drilling had been conducted on the eastern extension of the old Cedar Island Zone, for a 3280-foot strike length, to a depth of 820 feet. As of November, work was commencing on a further 26 240 feet of fill-in diamond drilling (The Northern Miner, November 30, 1987). St. Joe has committed to spending $2.45 million on exploration to earn a 50 percent interest in the property. St. Joe also conducted a geological survey on ground optioned from G. Pogson, in the Echo Bay area.

In the vicinity of the Scramble prospect in Jaffray Township, work continued in the name of Scramble Mining Limited under an agreement between Boise Cascade Canada and Madeleine Mines Limited. In addition to geochemical and geophysical surveys conducted on crown and private lands, diamond drilling and surface stripping was conducted on the wholly owned Scramble prospect, followed by commencement of work late in the year on a decline ramp to reach the orebody underground.

Mountain Lake Resources Incorporated continued an exploration program on the Gold Mountain prospect, on the Western Peninsula of Lake of the Woods, in the Wiley Bay area, acquired under an option agreement on four unpatented claims. Forty-seven additional claims were staked around the prospect. Gold values had previously been recorded on drilling by C. Kuryliw in 1973, and Cominco Limited in 1977.

Following stripping and sampling done in 1986, Mountain Lake Resources, in early 1987, conducted a diamond-drill program totalling 4084 feet over 10 holes. Although values up to 0.48 ounce gold per ton were reported, they were over limited widths, and sporadic. An airborne gradiometer and VLF-electromagnetic survey was also performed over a large portion of the Western Peninsula in conjunction with Canadian Nickel Company Limited, Midnapore (1979) Resources Incorporated, and W.F. Morrison (Assessment Files, Resident Geologist's Office, Kenora).

Gold Hill Resources Limited conducted VLF-electromagnetic and magnetometer surveys in early 1987, over 16 claims at Poplar Bay, in the Clearwater Bay area, Lake of the Woods. The claim group encompasses the Minerva gold prospect, from which 28 tons of ore averaging 2.72 ounces gold per ton were mined in 1885. Follow-up diamond drilling of nine holes, for a total of 2503 feet, was conducted on Minerva Island (Assessment Files, Resident Geologist's Office, Kenora).

Calnor Resources Limited, subsequent to a 22-hole diamond-drill program in 1986 at High Lake, Ewart Township, carried out a trenching and stripping program in 1987. In the 1986 program, two holes on the old Electrum Lake gold prospect had intersected noteworthy gold values of 22 feet grading 1.60 ounces gold per ton, and 11 feet grading 0.84 ounce gold per ton respectively, on an anomaly identified by a magnetometer survey and humus geochemical sampling. The 1987 program was designed to test other anomalies on the property, preparatory to further diamond drilling (George Cross News Letter, September 3, 1987).

Other persons and companies known to have done exploration for gold in the general Lake of the Woods–Shoal Lake area include: Canadian Nickel Company, who conducted geophysical surveys in Code Township; Noranda Exploration Company Limited who conducted geological, geochemical, and geophysical surveys in the Shoal Lake and Echo Bay areas; Homestake Mineral Development Company, who conducted a geological survey in the Clearwater Bay area; J. Brown and R. Fransoo, who did geophysical surveying at Crowduck Lake, Ewart Township; David Busch, who did stripping and sampling on the Arsenic Zone Occurrence, Ewart Township; G. Clark, J. Karwacki, and J. Doty, who did stripping and geophysical surveying on the Sweden and adjacent occurrences in Haycock Township; G. Pogson who did stripping and trenching on new discoveries near the Black Sturgeon Lake Occurrence, Haycock Township; E. Roberecki who did stripping on two occurrences, in Code Township and in the Echo Bay area; Voyager Exploration Limited who conducted geophysical surveying and diamond drilling in the Echo Bay area; and Golden Rule Resources Limited, who did diamond drilling in the Shoal Lake area.

Manitou–Wabigoon–Eagle Lakes Area

St. Joe Canada Incorporated drilled eleven holes totalling 3106.4 feet, targeted mainly on the Reliance Zone situated southwest of Upper Manitou Lake in the Lower Manitou Lake area. St. Joe Canada Incorporated was involved in a joint venture agreement with Explorco Properties, who agreed to spend $200 000 for drilling on the property. The drill program followed up results from earlier drilling which intersected low gold values across narrow intersections (The Northern Miner, February 16, 1987).

CanAmerican Precious Metals Incorporated, in an option-joint venture agreement with Cochrane Oil and Gas Limited, drilled fifteen holes totalling 766 m at the northeastern end of Upper Manitou Lake in the Boyer Lake area. The drillholes were targeted on a gold-bearing, 5 m to 8 m thick, quartz-pyrite stringer stockwork/breccia zone with an approximate strike length of 350 m, which was discovered during trenching and sampling late in 1986 (Assessment Files, Resident Geologist's Office, Kenora). The recent drilling delineated a gold-bearing zone with a drill-indicated and geologically inferred tonnage (to 100 m) ranging from 143 685 tonnes grading 5.21 g/t to 529 650 tonnes grading 3.2 g/t gold (Assessment Files, Resident Geologist's Office, Kenora).

Falconbridge Limited drilled four holes totalling 2364 feet during early 1987, targeted on the McEdna shaft, the Pincher Creek Zone, and the Trafalgar Bay Zone on Upper Manitou Lake in the Harper and Boyer Lakes areas (Assessment Files, Resident Geologist's Office, Kenora). Falconbridge Limited optioned 53 contiguous claims previously optioned by St. Joe Canada Incorporated, and drilled gold-bearing zones that St. Joe Canada had delineated on surface (Assessment Files, Resident Geologist's Office, Kenora). Falconbridge Limited also conducted a humus-sampling survey over various sections of the claim group.

Esso Minerals Canada continued exploration work on their claim group near Snake Bay of Stormy Lake, in the Kawashegamuk Lake area. The company drilled 14 holes totalling 4246.7 feet on the Twilight Zone, to follow up on encouraging gold values, such as 0.5 ounces gold per ton across 1.8 feet (George Cross News Letter, September 13, 1986), intersected during a 1986 drill program (Assessment Files, Resident Geologist's Office, Kenora).

Noranda Exploration Company Limited conducted a ground magnetometer survey over the Renders Occurrence located on the western shore of Thundercloud Lake in the Meggisi Lake area (Assessment Files, Resident Geologist's Office, Kenora).

Tanqueray Resources Limited, in a joint venture with Lightning Creek Mines Limited, drilled four holes on the Pidgeon–Wabigoon Lake Occurrence, located on the shore of Wabigoon Lake in the Butler Lake area. Drillholes intersected intensely carbonatized, mafic metavolcanics hosting quartz-tourmaline veins and containing between 5 and 50 percent pyrite. The best gold intersection assayed 0.172 ounce gold per ton across 6.7 feet, including a section assaying 0.23 ounce gold per ton across 4.7 feet (George Cross News Letter, March 3, 1987).

Kidd Creek Mines Limited conducted humus- and soil-sampling surveys, ground VLF-EM and Induced Polarization (IP) surveys, and geological mapping over their claims at the Flambeau Lake Prospect in the Contact Bay area (Assessment Files, Resident Geologist's Office, Kenora). Kidd Creek Mines Limited have subsequently dropped their option on the Flambeau Lake Prospect.

During early 1987, Van Horne Gold Exploration Incorporated drilled twelve holes, totalling 4772 feet, targeted on several gold prospects within their claim group in Van Horne Township, which the company has held since 1980. The best gold mineralization was intersected in holes drilled on the Glatz–Pritchard Lake Occurrence and the Vanlas Prospect near Pritchard Lake, west of Wabigoon Lake. The best hole intersected 0.26 ounce gold per ton across 24.6 feet including a section which assayed 0.71 ounce gold per ton across 8.4 feet (The Northern Miner, May 18, 1987). Van Horne Exploration entered into a joint venture agreement with Power Explorations, an associated company (The Northern Miner, May 18, 1987), and began an extensive 20 000-foot drill program during the summer of 1987, along with geological mapping, sampling, stripping, and ground geophysical surveys. Intersections encountered in some of the more recent drillholes were 0.23 ounce gold per ton across 43 feet, 0.33 ounce gold per ton across 7.9 feet, and 0.40 ounce gold per ton across 22 feet (The Dryden Observer, August 5, 1987). Van Horne Exploration has acquired patented ground from the Town of Dryden (The Dryden Observer, April, 15, 1987) and has entered into a joint venture agreement with Kidd Creek Mines to explore 24 claims which that company holds in the vicinity of Flambeau Lake (The Northern Miner, November 23, 1987).

G.M.L. Minerals Consulting Limited conducted airborne magnetometer and VLF-EM surveys over their claim group in MacFie Township in early 1987. The claims encompass the Alto–Gardnar Prospect, located northwest of MacFie Lake (Assessment Files, Resident Geologist's Office, Kenora).

Mistango Consolidated Resources drilled four holes totalling 1472 feet targeted on the Calder–Bousquet Occurrence at the south end of Troutfly Lake in Laval Township. One hole intersected 0.49 ounce gold per ton across 5.8 feet including a section of 1.33 ounces gold per ton across 2 feet, within a wide felsic dike hosting pyritic quartz veins and quartz stringers (Assessment Files, Resident Geologist's Office, Kenora).

Other persons and companies known to have done exploration for gold in the general Manitou–Wabigoon–Eagle Lakes area in 1987 include: geophysical surveys by International Platinum Corporation in Aubrey Township at Eagle Lake; geological mapping and stripping by Noranda Exploration Company Limited in the Buchan Bay area at Eagle Lake; geological work by S. Johnson and Wollex Exploration in the Turtlepond Lake area; geological mapping by St. Joe Canada Incorporated in the Contact Bay area; geological and geochemical surveys by Abermin Corporation in the Boyer Lake area; stripping and trenching by W. McAteer in the Boyer Lake area; trenching by E. Starr in the Turtlepond Lake area; geological work by J. Redden in the Tabor Lake area and stripping by D. Thibault in Tustin Township.

Fort Frances–Mine Centre Area

Orofino Resources Limited carried out a comprehensive exploration program on 153 claims optioned from Prospectors of Canada, in the Bad Vermilion Lake area. Results of geophysical, geological and humus geochemical surveys were tested with eleven diamond-drill holes, totalling 2500 feet, during the late Summer (F. Manns, Senior Geologist, Orofino Resources Limited, personal communication).

At the Olive Mine, in the Little Turtle Lake area, HSK Minerals Limited and Noront Resources Ltd. carried out an underground sampling and mapping program, and followed up with a 6500-foot drill program designed to test ore reserves to the 350-foot level (C. Page, Vice President of Exploration, HSK Minerals Limited, personal communication). HSK Minerals Limited and Noront Resources Ltd. announced reserves of 12 500 tons grading 0.24 ounce gold per ton in two mineralized shoots, and an additional 1100 tons of broken ore grading 0.31 ounce gold per ton in the second level stope (The Northern Miner, May 18, 1987, and June 29, 1987). The 6500-foot drill program also encountered two new parallel zones in the hanging wall of the main Olive Zone. The Northern Miner (June 29, 1987) reported: that assays from two drillholes include 0.178 ounce gold per ton across 5.5 feet, 0.096 ounce gold per ton across 5 feet, and 0.08 ounce gold per ton across 5.2 feet; and that Noront Resources Ltd. has the right to earn a 60 percent interest in the property.

On the Dinosaur and Smylie occurrences on the east side of Shoal Lake, in the Bad Vermilion Lake area, Seine River Resources carried out an airborne geophysical survey as well as stripping, sampling and detailed geological mapping during the past year (E. Gallo, consultant for Seine River Resources, personal communication). Mine Centre Gold Ventures carried out ground VLF-electromagnetic and magnetic surveys on nine claims covering the Finger Bay Fault in the Bad Vermilion Lake area. This survey was followed up with a 12 hole, 2792-foot diamond-drill program (Assessment Files, Resident Geologist's Office, Kenora).

P.I.R.P. Holdings Inc. carried out airborne VLF-electromagnetic and magnetic surveys over their 50-claim block centred on the Golden Star Mine, in the Bad Vermilion Lake area (Assessment Files, Resident Geologist's Office, Kenora).

Other work known to have been carried out in the area includes stripping by Federal Kirkland Mines Ltd. on their claims in the Little Turtle Lake area; electromagnetic and magnetic ground surveys by J.W. Redden on his claim block centred over the Alice "A" in the Bennett Lake area; stripping by L. Cousineau on his claims at Bear's Passage in Halkirk Township; and stripping by D. Kroocmo on his claims in the Factor Lake area (Assessment Files, Resident Geologist's Office, Kenora).

PLATINUM

During the year, several companies were actively engaged in exploration for platinum group elements in Kenora Mining Division. BP Canada Resources Limited, in a joint venture partnership with Equinox Resources Limited, carried out an airborne geophysical survey over their approximately 600-claim block, covering the Entwine Lake intrusion, in the Eagle Rock Lake area. Detailed geological mapping and sampling was carried out on the Beaver Pond showing, and on an area 5 km to the south. Reconnaissance mapping and sampling was carried out over other parts of the intrusion (A.T. Pryslak, Senior Geologist, BP Canada Resources Limited, personal communication). Six samples collected from the Beaver Pond showing by A.J. Macdonald (Geologist, Precambrian Geology Section, Ontario Geological Survey, personal communication) returned the following ranges, on analysis: 200 to 415 ppb gold; 215 to 545 ppb platinum; and 450 to 840 ppb palladium. Considerably higher values have been obtained by the joint venture partners in their detailed sampling program (A.T. Pryslak, personal communication).

Falconbridge Limited carried out ground VLF-electromagnetic and magnetic surveys and geological mapping on a 9-claim block optioned from R. Fairservice, in the Rex Lake area. Four diamond-drill holes were completed on the property (Ray Band, Senior Project Geologist, Falconbridge Limited, personal communication). International Platinum Corp. carried out ground VLF-electromagnetic and magnetic surveys, geological mapping, and sampling of old pits and trenches, on ground adjacent to that of Falconbridge Limited, and also optioned from R. Fairservice.

TABLE 1.4 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

AEM - Airborne Electromagnetic Survey
Amag - Airborne Magnetometer Survey
Assess - Assessment Work
Au - Gold
BS - Beneficiation Studies
BM - Base Metals
Cu - Copper
DD - Diamond Drilling
OVD - Overburden Drilling
UGDD - Underground Diamond Drilling (The numbers following "DD", "OVD" and "UGDD" indicates the number of holes drilled and the total length drilled respectively)
EM - Electromagnetic Survey

Geochem - Geochemical Survey
Geo R - Geological Report
GL - Geological Survey
IP - Induced Polarization
Mag - Magnetometer Survey
man - Manual Work
mec - Mechanical Work
MS - Monumental Stone
OMEP - Ontario Mineral Exploration Program
Rad - Radiometric Survey
Res - Resistivity Survey
SA - Sampling, Assaying
STr - Stripping
Tr - Trenching
Zn - Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Atikwa Lake	52F/05 NE	Martin, Roy A.	Au	Assess	EM, Mag, GL	1986	2.97180	II-1
Aubrey Township	52F/11 NE	International Platinum Corp.	Au	Assess	DD 11-5644', SA	1986	-	EE-1
Aubrey Township	52F/10 NW	Kidd Creek Mines Ltd.	Au	Assess	SA	1986	2.92870	TT-4
Aubrey Township	52F/10 NW	Kidd Creek Mines Ltd.	Au	Assess	DD 1-203'	1984	-	TT-6
Aubrey Township	52F/10 NW	Kidd Creek Mines Ltd.		Assess	EM	1987	2.10166	TT-9
Avery Township	52F/09 NW	Noranda Exploration Company	Au	Assess	Geochem	1986	2.94920	M-5
Avery Township	52F/09 NW	Noranda Exploration Company		Assess	STr	1986	-	M-6
Avery Township	52F/09 NW	Noranda Exploration Company	Au	Assess	GL, SA	1986	2.10484	M-7
Bad Vermilion Lake	52C/10 NE	Cleyo Resources Inc.	Au	OMEP	DD 7-1833', SA	1984	63.44980	UU-1
Bad Vermilion Lake	52C/10 NE	McKenzie-Grey	Au	Non Assess	DD 13-3903'	1985	-	H-2
Bad Vermilion Lake	52C/10 NE	Mine Centre Gold Venture Inc	Au	Assess	EM, Mag	1987	2.98650	RR-2
Bad Vermilion Lake	52C/10 NE	Mine Centre Gold Venture Inc	Au	Assess	DD 12-2792'	1986/87	-	RR-3
Bad Vermilion Lake	52C/10 NE	Orofino Resources Limited	Au	Assess	EM, Geochem	1986/87	2.10015 2.98670	XX-1
Bad Vermilion Lake	52C/10 NE	Orofino Resources Limited	Au	Assess	Geochem, EM, Mag	1986/87	2.98660 2.10010	XX-2
Bad Vermilion Lake	52C/10 NE	Orofino Resources Limited	Au	Assess	EM, Mag	1986/87	2.10334	XX-3
Bad Vermilion Lake	52C/10 NE	Orofino Resources Limited	Au	Assess	EM, Mag	1986/87	2.10335	XX-4
Bad Vermilion Lake Little Turtle Lake	52C/10 NE 52C/15 SE	P.I.R.P. Holdings Inc.	Au	Assess	AEM, AMag	1987	2.10067	MM-9
Bad Vermilion Lake Wild Potato Lake	52C/10 NE 52C/09 NW	Seine River Resources Inc.	Au	Assess	AEM, AMag	1987	2.10349	YY-1
Bigstone Bay	52E/09 NW	President Mines Ltd.		OMEP	EM, Geochem	1984	63.46540	SS-16
Bigstone Bay	52E/09 NW	Roberecki, Ed	Au	Assess	STr	1986	-	TT-4
Bliss Lake	52C/10 NW	Corporation Falconbridge	BM	Assess	DD 4-6942'	1987	-	W-6
Bliss Lake	52C/10 NW	Minnova Inc.	BM	Assess	DD 2-2407'	1985	-	Y-1
Bluffpoint Lake Pipestone Lake	52F/03 NW 52F/09 NE	Consolidated Silver Standard	Au	Assess	GL, Geochem	1986	2.10111	R-2
Boyer Lake	52F/07 NE	Canamerican Precious Metals	Au	Assess	DD 15-2612'	1987	-	YY-1
Boyer Lake	52F/07 NE	Cochrane Oil & Gas Ltd.	Au	Assess	EM, Mag, SA	1985	2.96520	PP-5
Boyer Lake	52F/07 NE	Cochrane Oil & Gas Ltd.	Au	Assess	DD 10-2506', Geo R	1984	-	PP-4
Boyer Lake	52F/07 NE	Falconbridge Ltd.	Au	Assess	DD 4-2364'	1987	-	XX-1
Boyer Lake	52F/07 NE	McAteer, W.	Au	Assess	STr, mec	1987	-	ZZ-1
Boyer Lake	52F/07 NE	Noranda Exploration Company	Au	Assess	SA	1986	2.97320	UU-3
Boyer Lake	52F/07 NE	Noranda Exploration Company		Assess	STr	1986	-	UU-2

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Boyer Lake	52F/07 NE	Osisko Lake Mines Ltd.	Au	Non Assess	2 Qualifying Rpts.	1974	-	S-2
Boyer Lake	52F/07 NE	Prophet Resources Ltd.	Au	Assess	Geochem, SA, GL	1986	2.96600	WW-1
Boyer Lake Harper Lake Lower Manitou Lake	52F/07 NE 52F/07 NW 52F/07 SW	St. Joe Canada Inc.	Au	OMEP	Report	1983/84	63.44130	LL-4
Boyer Lake Turtlepond Lake	52F/07 NE 52F/10 SE	Starr, Eugene	Au	Assess	Tr mec	1987	-	GG-4
Bridges Township	52F/13 SE	Rio Algom Exploration Inc.	BM	Assess	DD 3-1341'	1986	-	B-4
Brooks Lake	52F/04 NE	Frances Resources Ltd.		Assess	EM, Mag, IP, Res	1987	2.10066	O-2
Brooks Lake	52F/04 NE	Frances Resources Ltd.		Assess	SA	1986	2.10060	O-3
Brooks Lake	52F/04 NE	Laramide Resources Ltd.	Au	Assess	SA, Tr, GL	1986	2.10065	X-2
Brooks Lake	52F/04 NE	Laramide Resources Ltd.		Assess	Tr, SA	1986	2.10061	X-1
Buchan Bay	52F/11 NE	Noranda Exploration Company		Assess	Str man	1987	-	FF-1
Butler Lake	52F/10 NE	Fairservice, Robert	Au	Assess	DD 1-350'	1987	-	M-2
Clearwater Bay	52E/10 NE	Gold Hill Resources Inc.		Assess	EM, Mag	1987	2.99760	DD-2
Clearwater Bay	52E/10 NE	Gold Hill Resources Inc.	Au	Assess	DD 9-2503'	1987	-	DD-1
Code Township	52E/09 SE	Canadian Nickel Company		Assess	SA	1985/86	2.10431	X-2
Code Township	52E/09 SE	Roberecki, Ed		Assess	Str mec	1987	-	Q-5
Contact Bay Aubrey Township	52F/10 NW	Hoban, Michael J.	Au	Assess	Tr	1986	-	OO-8
Contact Bay	52F/10 NW	Kidd Creek Mines Ltd.	Au	Assess	SA	1985/86	2.99200	TT-5
Contact Bay	52F/10 NW	Kidd Creek Mines Ltd.		Assess	GL	1987	2.10167	TT-7
Contact Bay	52F/10 NW	Kidd Creek Mines Ltd.		Assess	Geochem, SA	1987	2.10417	TT-8
Dash Lake	52F/04 SE	Cummings, Walter M.	Au	Assess	Geochem, SA	1986/87	2.98720	M-1
Dash Lake	52F/04 SE	Cummings, Walter M.		Assess	GL, Geochem, SA	1987	2.10288	M-2
Dash Lake	52F/04 SE	McChip-Jascan Joint Venture	Au	Assess	DD 4-1358', SA, Geo R	1987	-	N-1
Dash Lake	52F/04 SE	Pitkanen, R. W.		Assess	STr, man	1987	-	L-2
Dash Lake	52F/04 SE	Pitkanen, Reino, W.	Au	Assess	STr	1986	-	L-1
Dogpaw Lake Rowan Lake	52F/05 SW 52F/05 SE	Canadian Nickel Company		Assess	EM, Mag, Rad, GL	1983/87	2.10356	C-14
Dogpaw Lake	52F/05 SW	Canadian Nickel Company		OMEP	DD 13-9582', IP, Geochem	1985	63.46480	C-13
Dogpaw Lake	52F/05 SW	Doal, D.R.	Au	Assess	EM, Mag	1986	2.97250	SSS-1
Dogpaw Lake	52F/05 SW	Doal, D.R.		Assess	AEM, AMag	1987	2.10315	SSS-2
Dogpaw Lake	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	Geochem	1986	2.95920	PPP-5
Dogpaw Lake	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	GL	1986	2.96410	PPP-6
Dogpaw Lake Tweedsmuir Township	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	Mag	1986	2.95750	PPP-4
Dogpaw Lake	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	DD 8-2083', SA	1986	-	PPP-7
Dogpaw Lake	52F/05 SW	First General Mine Mgmt.	Au	Assess	DD 2-539'	1986	-	NNN-3
Dogpaw Lake	52F/05 SW	Flint Rock Mines Limited	Au, BM	OMEP	GL	1985	63.44740	FFF-2

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Dogpaw Lake	52F/05 SW	Frances Resources Ltd.	Au	OMEP	STr, SA	1983	63.43550	RRR-1
Dogpaw Lake	52F/05 SW	LaFleche, Gerald		Assess	EM, Mag, GL	1987	2.10190	EEE-7
Dogpaw Lake	52F/05 SW	Lafleche, Gerald		Assess	STr man	1987	-	EEE-6
Dogpaw Lake	52F/05 SW	Micham Exploration Inc.	Au	Assess	SA	1986	2.98440	YY-4
Dogpaw Lake	52F/05 SW	Micham Exploration Inc.	Au	Assess	DD 4-543'	1986	-	YY-3
Dogpaw Lake	52F/05 SW	Sherritt Gordon Mines Ltd.	Au	Assess	DD 4-1360'	1987	-	PP-8
Dogpaw Lake	52F/05 SW	Sherritt Gordon Mines Ltd.		OMEP	GL	1984	63.45470	PP-9
Echo Bay Boys Township	52E/10 NW	Noranda Exploration Company		Assess	GL	1987	2.10436	HH-5
Echo Bay	52E/10 NW	Noranda Exploration Company		Assess	Geochem, SA	1987	2.10392	HH-4
Echo Bay	52E/10 NW	Roberecki, Ed		Assess	Str mec	1987	-	KK-1
Echo Bay	52E/10 NW	St. Joe Canada Inc.	Au	Assess	GL	1987	2.10276	JJ-1
Echo Bay	52E/10 NW	Voyager Exploration Ltd.	Au	Assess	EM, Mag	1987	2.99600	II-1
Ewart Township	52E/11 NE	Brown, J.,Fransoo, R.		Assess	EM	1987	2.10116	SS-1
Ewart Township	52E/11 NE	Esso Resources Canada Ltd.	Au	Assess	EM, Mag	1986	2.96750	QQ-1
Ewart Township	52E/11 NE	Roberecki, Joel	Au	Assess	STr	1986	-	LL-4
Ewart Township	52E/11 NE	Scout Resources		Assess	EM, Mag, GL	1986	2.97190	RR-1
Ewart Township	52E/11 NE	Stephens, G.A.	Au	Assess	DD 22-7594', Geochem, EM	1986	-	OO-4
Factor Lake	52C/09 NE	Kroocmo, David M.	Au	OMEP	STr, Tr	1983	63.45040	B-7
Factor Lake	52C/09 NE	Kroocmo, David M.	Au	Assess	STr	1987	-	B-8
Halkirk Township	52C/10 NW	Cousineau, Louis		Assess	STr, Tr	1986	-	U-5
Halkirk Township	52C/10 NW	Cousineau, Louis	Au, BM	Assess	mec STr, man STr	1986-87	-	U-6
Halkirk Township Watten Township	52C/11 NE	Kalrock Developments Ltd.	Cu, Zn	OMEP	Report, SA	1983	63.43830	OO-2
Harper Lake Manitou Lake	52F/07 NW 52F/07 SW	St. Joe Canada Inc.	Au	Assess	DD 5-964', SA	1985	2.95120	H-15
Haycock Township	52E/16 SW	Clark, H. G., Karwacki, J.		Assess	SA	1987	2.10279	X-12
Haycock Township	52E/16 SW	Clark, H.G., Doty, J.	Au	Assess	STr	1987	-	X-11
Haycock Township	52E/16 SW	Pogson, Gordon		Assess	STr, mec	1987	-	II-1
Haycock Township	52E/16 SW	Pogson, Gordon		Assess	Tr mec	1987	-	II-2
Heronry Lake	52F/04 NW	Canadian Nickel Company Ltd.	Au	Assess	DD 3-991'	1985	-	D-7
Heronry Lake	52F/04 NW	Canadian Nickel Company Ltd.	Au	Assess	DD 6-4082'	1987	-	D-8
Heronry Lake Godson Township	52F/04 NW	Payton Ventures Inc.	Au	Assess	SA, Geochem, GL, Mag	1986	2.99490	AA-1
Jaffray Township	52E/16 SW	Asarco Exploration Company	Au	Assess	DD 15-2954', STr	1986	-	GG-1
Jaffray Township	52E/16 SW	Boise Cascade Canada	Au	OMEP	Report, I.P.	1984	63.45060	BB-7
Jaffray Township	52E/16 SW	Kennco Explorations (Canada)		OMEP	DD 8-3187', GL, Geochem	1985	-	DD-3
Jaffray Township	52E/16 SW	Scramble Mining Ltd.	Au	Assess	Geochem, GL, SA	1986	2.98080	HH-1
Jaffray Township	52E/16 SW	Scramble Mining Lt	Au	Assess	Geochem	1987	2.10156	HH-3
Jaffray Township	52E/16 SW	Scramble Mining Ltd.	Au	Assess	Mag, EM	1987	2.10155	HH-2

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Kawashegamuk Lake	52F/08 NW	Esso Minerals Canada	Au	Assess	DD 17-5245'	1986/87	-	R-4
Kawashegamuk Lake Boyer Lake Meggisi Lake	52F/08 NW 52F/07 NE 52F/07 SE	Esso Minerals Canada	Au	OMEP	Geochem, GL, SA	1984	-	R-5
Kawashegamuk Lake	52F/08 NW	International Platinum Corp.	Au	Assess	STr	1986	-	AA-1
Kirkup Township	52E/09 NW	Hansen, Edward N.		Assess	GL, Geochem	1985/86	-	WW-3
Kirkup Township	52E/09 NW	Kidd Creek Mines Ltd.	Au	Assess	GL	1984/85	2.95830	BBB-3
Kirkup Township	52E/09 NW	Nilson, Alastair		Assess	GL, Geochem	1985	2.10314	DDD-1
Kirkup Township Haycock Township	52E/09 NW	President Mines Limited		Assess	GL, SA, BS	1986	2.10033	SS-17
Laval Township	52F/16 SW	Mistango Consolidated	Au	Assess	DD 4-1472', SA	1986	-	T-2
Lawrence Lake	52F/06 SW	Claggett, Robert, A.		Assess	STr mec	1986/87	-	F-1
Line Lake	52F/11 SW	Hansen, E.	Au	Assess	STr	1986	-	I-1
Little Turtle Lake	52C/15 SE	Federal Kirkland Mines Ltd.	Au	Assess	mec STr	1987	-	DD-2
Little Turtle Lake Bad Vermilion Lake	52C/15 SE 52C/10 NE	Homestake Explorations	Au	OMEP	BS	1983	63.43600	BB-4
Lobstick Bay	52F/05 NW	BP Resources Canada Limited	Au	Assess	DD 1-449'	1986	-	N-10
Lobstick Bay	52F/05 NW	BP Resources Canada Limited	Au	Assess	DD 4-1987'	1985/86	-	N-11
Lobstick Bay	52F/05 NW	Fairservice, R. J.	Au	Assess	EM, Mag	1987	2.10213	K-3
Long Point Island	52E/08 NE	Lodi Metals Inc.		OMEP	DD 5-1220', Geo R, EM	1985	63.45430	Q-1
Lower Manitou Lake Harper Lake Boyer Lake	52F/07 SW 52F/07 NW 52F/07 NE	Cochrane Oil & Gas Ltd.	Au	OMEP	EM, Mag	1985	63.46420	X-5
Lower Manitou Lake et al	52F/07 SW	Jalna Resources Ltd.	Au	OMEP	GL, Geochem, SA	1983	-	Z-5
Lower Manitou Lake Harper Lake	52F/07 SW 52F/07 NW	St. Joe Canada Inc.	Au	Assess	Geochem, SA	1985	2.96570	U-13
Lower Manitou Lake Harper Lake	52F/07 SW 52F/07 NW	St. Joe Canada Inc.	Au	Assess	DD 11-3106'	1987	-	U-14
Lower Manitou Lake	52F/07 SW	Wright, R.J.	Au	Assess	DD 11-5510, SA	1984	-	W-24
MacFie Township	52F/16 SW	Bernier, Michael	Au	Assess	EM, SA	1983	2.60330	W-1
MacFie Township	52F/16 SW	Loydex Resources Inc.	Au	Assess	AEM, AMag	1987	2.10224	X-1
Mang Lake Lower Manitou Lake	52F/02 NW 52F/07 SW	Jalna Resources Ltd.	Au	OMEP	IP, Mag, EM, Res	1984	-	D-3
Mang Lake Lower Manitou Lake	52F/02 NW 52F/07 SW	Jalna Resources Ltd.	Au	OMEP	GL, SA	1984	-	D-4
Manross Township	52E/09 SW	Roberecki, Ed		Assess	STr	1986	-	O-5
Meggisi Lake	52F/07 SE	Noranda Exploration Company	Au	Assess	Mag	1987	2.99130	F-1
Napanee Lake	52F/03 NE	Sparton Resources Ltd.	Au	Assess	DD 3-1109'	1986	-	K-6
Revell Township	52F/09 SE	Glatz, Alexander	Au	Assess	SA, mec Tr	1986	2.10206	I-9
Revell Township	52F/09 SE	Nelson, Carter		Assess	MS	1986	2.98260	L-1
Rickaby Lake	52L/11 NE	Dome Exploration (Canada)		Assess	EM, Mag	1987	2.10321	N-1
Rowan Lake Dogpaw Lake	52F/05 SE 52F/05 SW	Canadian Nickel Company Ltd.	Au	Assess	SA	1984/85	2.10020	F-9
Rowan Lake Dogpaw Lake	52F/05 SE 52F/05 SW	Canadian Nickel Company Ltd.	Au	Assess	DD 8-3719', SA	1985	-	F-8
Rowan Lake Dogpaw Lake	52F/05 SE 52F/05 SW	Cream Silver Mines Ltd.	Au	Assess	EM, Geochem, SA	1986	2.96590	DDD-2

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rowan Lake Brooks Lake	52F/05 SE 52F/04 NE	Golden Transit Resources		OMEP	Geochem	1984	-	ZZ-3
Rowan Lake	52F/05 SE	International Platinum Corp.	Au	Assess	DD 8-3552'	1987	-	RRR-1
Rowan Lake	52F/05 SE	Langelaar, J.	Au	Assess	EM, Mag	1987	2.99880	SSS-1
Rowan Lake	52F/05 SE	Loydex Resources Inc.		OMEP	EM	1984/85	63.45420	FFF-3
Rowan Lake	52F/05 SE	Nucanolan Resources Ltd.	Au	Assess	DD 2-173'	1987	-	PPP-2
Rowan Lake	52F/05 SE	Nuinsco Resources Limited	Au	Assess	OVD 269-21007', SA	1986	2.96210	JJ-14
Rowan Lake	52F/05 SE	Nuinsco Resources Limited	Au	OMEP	DD 59-32456'	1985	63.46480	JJ-15
Rowan Lake	52F/05 SE	Nuinsco Resources Limited	Au	OMEP	DD 27-18321' GL	1983/84	63.44880	JJ-16
Rowan Lake	52F/05 SE	Nuinsco Resources Limited	Au	OMEP	DD 20-15299' GL	1984	63.44880	JJ-17
Rowan Lake	52F/05 SE	Pacific Seadrift Mining		Assess	DD 9-5090'	1986/87	-	TTT-1
Rowan Lake	52F/05 SE	Silver Lake Resources Inc.	Au	OMEP	DD 1-787'	1984	63.44310	III-4
Shoal Lake	52E/10 SW	Eclipse Resources Corp.		OMEP	Mag, EM, SA	1984	63.45690	PP-1
Shoal Lake	52E/10 SW	Golden Rule Resources Ltd.	Au	Assess	DD 5-1614'	1987	-	MM-1
Shoal Lake Echo Bay & Boys Twp.	52E/10 SW 52E/10 NW	Noranda Exploration Company	Au	Assess	GL	1986	2.97510	0-3
Shoal Lake Echo Bay & Boys Twp.	52E/10 SW 52E/10 NW	Noranda Exploration Company		Assess	EM, Mag	1987	2.10038	0-4
Shoal Lake Echo Bay	52E/10 SW 52E/10 NW	Noranda Exploration Company		Assess	Geochem, SA	1986/87	2.10278	0-5
Shoal Lake	52E/10 SW	St. Joe Canada Inc.		Assess	GL	1987	2.10215	QQ-1
Shoal Lake	52E/10 SW	St. Joe Canada Inc.		Assess	DD 1-1377'	1987	-	QQ-2
Snowshoe Bay	52E/11 SE	Consolidated Professor Mines	Au	OMEP	UGDD 144-21709', SA	1984/85	63.44640	B-4
Snowshoe Bay	52E/11 SE	Mickelson, A.		OMEP	Prospecting	1985	63.46530	Q-3
Tabor Lake Kawashegamuk Lake	52F/09 SW 52F/08 NW	International Platinum Corp.	Au	Assess	DD 6-804', SA, GL	1983/84	2.96090	LL-1
Tabor Lake	52F/09 SW	Monte Cristo Resources Ltd.	Au	OMEP	Report	1983	-	JJ-1
Turtlepond Lake	52F/10 SE	St.Joe Canada Incorporated		Assess	Mag	1987	-	GG-1
Tustin Township	52F/13 SW	Thibault, Douglas	Au	Assess	mec STr	1987	-	CC-1
Watten Township	52C/11 NE	Kidd Creek Mines Ltd.	BM	Assess	DD 1-1098'	1986	-	QQ-6
Wild Potato Lake	52C/09 NW	Log Cabin Occurrence	Au	Non Assess	AEM, GL	1986	-	A-1
Wiley Bay	52E/10 SE	Belanger, Douglas	Au	Assess	DD 4-808', SA	1986	-	S-1
Wiley Bay Shoal Lake Clearwater Bay, et al	52E/10 SE 52E/10 SW 52E/10 NE	Canadian Nickel Company	Au	Assess	AEM, AMag	1974	2.96920	T-1
Wiley Bay Shoal Lake	52E/10 SE 52E/10 SW	Canadian Nickel Company Ltd.		Assess	AEM, AMag	1987	2.10131	T-2
Wiley Bay	52E/10 SE	Gold Mountain	Au	OMEP	Report, SA	1983/84	-	J-2
Wiley Bay	52E/10 SE	Midnapore 1979 Resources Inc		Assess	AEM, AMag	1987	2.10248	U-1
Wiley Bay	52E/10 SE	Mountain Lake Resources Inc.		Assess	DD 10-4184', SA	1987	2.10195	Q-3
Wiley Bay	52E/10 SE	Roberecki, Ed	Au	Assess	STr, man	1985	-	R-1

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Willingdon Township	52E/08 NE	Moses, John R., Reukl, R.		Assess	EM, Mag	1986	2.98140	P-1
Wonderland Lake	52L/01 SE	Nelson, Carter		Assess	mec, man	1987	-	B-1

The program included the diamond drilling of four holes on the property (J. Trusler, Vice President International Platinum Corp., personal communication).

Other companies known to be conducting exploration for platinum group elements include St. Joe Gold Corporation, and Eldor Resources Limited, both south of Dryden; and Contwoyto Goldfields Limited, southwest of Dryden.

BASE METALS

Only one major program for base metals was ongoing in the Kenora Mining Division in 1987.

Minnova Inc. continued work on their Swell Bay project, located in Farrington Township, and the Little Turtle Lake and Bliss Lake areas, with geological mapping at 1:5000 and at 1:2500, ground geophysical and geochemical surveys, and stripping, at the Port Arthur Copper Mine and the Mathieu Occurrence. A further 28 diamond-drill holes tested targets on the property during the year (M. Flanagan, Project Geologist, Minnova Inc., personal communication).

PROPERTY EXAMINATIONS

In 1987, the following mining and exploration properties, and mineral occurrences and prospects were examined by staff of the Kenora Resident Geologist's office. Their location is illustrated in Figure 1.2.

GOLD:

1. ALIO4 and AL105 Occurrences—Bad Vermilion Lake area
2. Alto-Gardnar Prospect—MacFie Township
3. Ambrose (Gull Island) Prospect—Wiley Bay area
4. Bath Island Occurrence—Whitefish Bay area
5. Bonanza and Redeemer Mines—Van Horne Township
6. Brockman Prospect—Tabor Lake area
7. Cameron Island (Duport) Mine—Snowshoe Bay area
8. Cameron Lake (Nuinsco-Echo Bay) Mine Development—Rowan Lake area
9. Calder-Bousquet Occurrence—Laval Township
10. Church Lake and New Church Lake Occurrences—Kawashegamuk Lake area
11. E.D.B.—1 Prospect—Contact Bay area
12. Electrum Lake Occurrence—Ewart Township
13. Flambeau Lake Prospect—Aubrey and Van Horne Townships
14. Geroux Occurrence—Echo Bay area
15. Fornieri Bay Prospect—Buchan Bay area
16. Frederick Mining Occurrence—Buchan Bay area
17. Gold Mountain Prospect—Wiley Bay area
18. Golden Park Prospect--Van Horne Township
19. Hansson, E. Occurrence—Wapageisi Lake area
20. Jensen-Johnston (Bag Lake) Occurrence—Dogpaw Lake area
21. Johnson-Contact Bay Occurrence—Contact Bay area
22. Johnson-Mountdew Lake Occurrences—Boyer Lake area
23. Long Lead Prospect—Contact Bay area
24. Longe, R. Occurrence—Buchan Bay area
25. Midnapore-Ayer Occurrence—Wiley Bay area
26. Minnehaha Lake Prospect—Turtlepond Lake area
27. Moose Bay Prospect—Turtlepond Lake area
28. North Twin Island Occurrence—Garnet Bay area
29. Pioneer Island Occurrence—Garnet Bay area
30. Pogson-Black Sturgeon Lake Occurrence—Haycock Township
31. Poirier Occurrence—Phillips Township
32. Rivers Option Occurrence—McAree Township
33. Scramble Prospect—Jaffray Township
34. Sukava, A. Occurrences—Buchan Bay area
35. Sweden and Gordon Occurrences—Haycock Township
36. Swell Bay Occurrence—Halkirk Township
37. Vanlas Prospect—Van Horne Township
38. Whitewater Lake Occurrences—Turtlepond Lake area
39. W.W. Smith Prospect—Buchan Bay area

OTHER METALS:

40. Alcock-Mosher Occurrences (Ni, Cu, Precious Metals) Reynar Lake area
41. Aylsworth Road Occurrence (S)—Aylsworth Township
42. Bear Bay Occurrence (Cu)—Whitefish Bay area
43. Frederick Mining and Development Occurrences (Au, Cu, Precious Metals)—Rex Lake area
44. Gordon Lake (Consolidated Canadian Faraday) Mine (Cu, Ni)—Werner Lake area
45. High Lake Porphyry Copper Zone (Cu)—Ewart Township
46. Island Bay Copper Occurrences (Cu)—Bad Vermilion Lake area
47. Nabish Lake Occurrence (Cu, Ni)—Contact Bay area
48. Nilsen-Gauthier Occurrence (Cu, Ni)—Atikwa Lake area

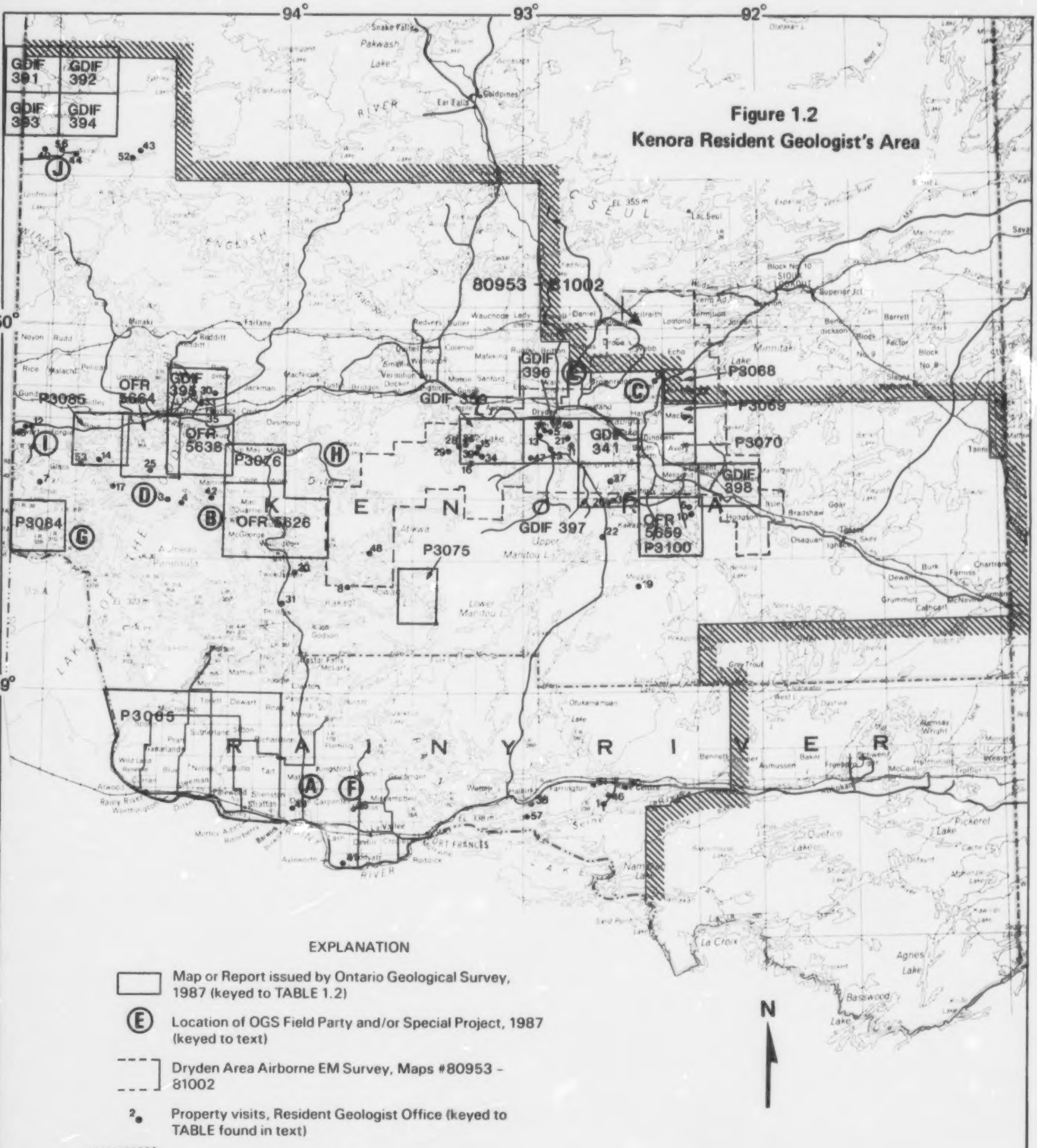


Figure 1.2
Kenora Resident Geologist's Area

94°
93°
92°
50°
49°
GDIF 391
GDIF 392
GDIF 393
GDIF 394
80953 - 81002
GDIF 396
GDIF 395
GDIF 339
GDIF 341
GDIF 398
GDIF 397
OFR 5664
OFR 5638
OFR 5626
OFR 5659
P3085
P3076
P3084
P3075
P3068
P3069
P3070
P3100
P3065
K E N O R A
R A I N Y R I V E R
LAC SEUL
ENGLISH RIVER
LAKE OF THE WOODS
RAINY RIVER
FORT FRANCES
Upper Manitou L.
Lower Manitou L.
Pakwash Lake
Namakan Lake
Pickerel Lake
Quetico Lake
La Croix
Agnes Lake
Basswood Lake
A
B
C
D
E
F
G
H
I
J
N
EXPLANATION
Map or Report issued by Ontario Geological Survey, 1987 (keyed to TABLE 1.2)
Location of OGS Field Party and/or Special Project, 1987 (keyed to text)
Dryden Area Airborne EM Survey, Maps #80953 - 81002
Property visits, Resident Geologist Office (keyed to TABLE found in text)
Boundary of Resident Geologists's Area
SCALE
0
25 mi.
0
20
40 km

49. Northwest Dobie Occurrence (S)—Dobie Township
50. Pidgeon Occurrence (Cu, Zn)—Little Turtle Lake area
51. Port Arthur Copper Mine and Mathieu Occurrence (Cu, Zn) Little Turtle Lake area
52. Radio-Active Minerals Limited and Quebec Nickel Corporation Occurrences (Cu, Precious Metals)—Rex Lake area
53. Squaw Lake Occurrence (Cu)—Echo Bay area
54. Stewart Lake Road Occurrences (Cu, Py, Po)—Wild Potato Lake area
55. Topham–Norris Occurrence (Cu)—Burriss Township
56. Werner Lake Cobalt Mine (Co, Au, Ni)—Werner Lake area
57. Wind Bay Magnetite–Ilmenite Occurrence (Ti) Halkirk Township

GOLD DEPOSITS NEAR DRYDEN

by J. Parker

The following are descriptions of some gold occurrences and prospects that were visited during 1987.

Whitewater Lake Occurrences

Whitewater Lake is located southwest of Dinorwic Lake and immediately west of Kaminnassin Lake in the Turtlepond Lake area, approximately 32 km southwest of Dryden. Numerous gold occurrences are located in the vicinity of Whitewater Lake, and are encompassed by claims currently held by Stan and Sherridon Johnson (Prospectors, Dryden).

Carl Mosher made the first discovery of gold along the northwestern shore of Whitewater Lake during the 1930s (Stan Johnson, Prospector, Wabigoon, personal communication). Claims have been staked and restaked in the vicinity of Whitewater Lake since 1957. The only record of work done in the area is of ground magnetic and electromagnetic surveys conducted along the north shore of the lake by Whitewater Gold Mines Limited, in 1973 (Assessment Files, Resident Geologist's Office, Kenora). Stan and Sherridon Johnson made numerous new gold discoveries in the vicinity of the lake during 1986. Their claims were optioned to Comaplex Resources, who conducted a reconnaissance-sampling survey, but subsequently dropped the option in late 1987.

The Whitewater Lake gold occurrences are situated within the Lower Wabigoon Volcanics, a mixed sequence of calc-alkalic to tholeiitic, mafic to felsic, metavolcanic flows and pyroclastics which are known to host numerous gold occurrences and prospects, and three past-producing mines, in the Eagle–Wabigoon Lakes area (Parker 1986, 1987). The gold occurrences at Whitewater Lake are 2.4 km west of the northeast-trending Manitou Straits Fault and occur within numerous, north-northeast-trending shear zones, subparallel to the fault (Parker 1987). The known occurrences consist of the original gold discovery on the northwestern shore of Whitewater Lake; a new test pit on the eastern shore of the lake; numerous new and old test pits north and northeast of Whitewater Lake, between Whitewater Lake and Turtlepond Lake to the northeast; an open cut situated between Kaminnassin and Whitewater Lakes; and a vein on the north shore of a small unnamed lake immediately north of Whitewater Lake.

The new test pit on the east shore of the lake has been sunk on quartz veins hosted by pale grey, pillowed, mafic, metavolcanic flows with abundant amygdules and feldspar phenocrysts. The rocks are carbonatized (calcium carbonate), sericitized, contain up to 15 percent fine-grained, disseminated pyrite, and are sheared at 015° to 020°, dipping vertically or steeply west. Quartz veins are controlled by shearing, and by northwest- or west-trending tension fractures which crosscut shearing. Veins are generally 5 to 10 cm wide with numerous blue-gray quartz stringers, less than 1 cm wide, occurring throughout. Veins contain angular fragments and "stringers" of very pyritic wallrock and chlorite, but pyrite does not commonly occur within the quartz. Visible gold was observed in the quartz veins by the author. Three random grab samples of the wallrock, taken by the author from the test pit, analyzed 345, 2070, and 3610 ppb gold respectively, while two samples of the quartz vein material assayed 200 and 1480 ppb gold respectively (Ontario Geological Survey, Geoscience Laboratories, Toronto).

The original Whitewater Lake Occurrence, on the northwestern shore of the lake, consists of a 0.3 to 0.6 m wide, east-trending quartz vein cutting sheared, chloritic, carbonatized, mafic metavolcanic flows. The vein consists of "sugary" white quartz containing dark green to black chlorite stringers, disseminated pyrite, chalcopyrite, galena, and fine-grained flakes of visible gold. A grab sample of the vein, taken by the author, analyzed 1.56 ounces gold per ton while a sample of the wallrock assayed 1315 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

The new test pits excavated by Stan and Sherridon Johnson between Whitewater and Turtlepond Lakes have been sunk on intensely sheared, fissile, rusty, sericitized, iron carbonatized, mafic metavolcanic flows and tuffs. The wallrocks next to the quartz veins are very pale gray-green, contain green mica and 3 to 5 percent disseminated pyrite. Quartz veins are generally narrow but numerous, and consist of white quartz containing dark green chlorite stringers and associated pyrite. Five grab samples of the wallrock, taken by the author from the various trenches, analyzed 895, 1290, 1670, 2440, and 3520 ppb gold respectively, while two samples of quartz vein material analyzed 430 and 855 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto). At these occurrences, the altered wallrocks host richer gold mineralization than the quartz veins.

Old trenches situated approximately 250 m due west of the new test pits have been sunk on a 0.3 to 0.46 m wide quartz vein striking 010°, and dipping vertically or steeply west. The vein has been trenched for a strike length of about 70 m and consists of white quartz, iron carbonate, calcite and disseminated bornite, chalcopyrite and pyrite. The vein has a banded appearance, with dark green bands of chlorite extending parallel to the vein contacts. The wallrocks consist of intensely sheared, fissile, intermediate tuff, and contain abundant iron carbonate and calcite but lack sulphides. Grab samples of the quartz vein, taken along the strike of the vein by the author, analyzed 540, 2630, 3390, and 4180 ppb gold, with lesser values of 4 and 180 ppb gold from samples taken at the northeast end of the vein. A grab sample of the wallrock analyzed 9 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Another gold showing is located at an old open cut situated between Whitewater Lake and Kaminnassin Lake. The open cut has been driven on a 0.6 m wide quartz vein and numerous narrow quartz veinlets, hosted by intensely sheared, mafic metavolcanics. The shear zone strikes 020° and dips steeply west. The host rocks are fissile, carbonatized, sericitized, and pale green-yellow with a "waxy" appearance. The rocks contain abundant fine-grained, finely disseminated pyrite. The quartz veins consist of white quartz and iron carbonate, with variable amounts of pyrite, chalcopyrite, galena, and some malachite.

Two grab samples from the quartz vein, taken by the author, and containing less than one percent sulphides assayed 0.76 and 1.62 ounces gold per ton, while a sample of the wall rock analyzed 8100 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Gold mineralization is distributed extensively throughout the Whitewater Lake area as indicated from sampling conducted by Comaplex Resources, Stan and Sherridon Johnson (Stan Johnson, prospector, Wabigoon, personal communication), and the author. The author obtained gold values from other locations in the area, including assays of 5410 ppb gold and 0.5 ounce gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto) from grab samples taken from a quartz vein on the north shore of the small unnamed lake north of Whitewater Lake. Gold is closely associated with intensely altered, very pyritic wall rocks within north-northeast-trending shear zones and with quartz veins controlled by the shears and cut by intersecting tension fractures. Widespread shearing, alteration and gold mineralization occurs in the vicinity of Kaminnassin Lake and Turtlepond Lake, indicating an extensive area with good exploration potential.

Minnehaha Lake Prospect

The Minnehaha Lake Prospect is located due north of the large bay at the eastern end of Minnehaha Lake, between Minnehaha Lake and Whitewater Lake to the north, in the Turtlepond Lake area. The prospect is approximately 33 km southeast of Dryden.

Work was reported to have started at the Minnehaha Lake Prospect (Mining Locations S.V. 234 and S.V. 235) in 1905, and a 100-foot shaft with a 25-foot crosscut at the bottom was completed by 1906 (Corkill 1907; 1909). A 25-foot test pit was sunk and some trenching was completed by 1908, when operations ceased (Corkill 1909). The property was reactivated in 1910, and a 40-foot adit was developed by 1911, when development work finally came to an end (Parsons 1911).

The present property was staked in 1982, and optioned by Asamera Minerals Incorporated who added it to a claim group of 97 contiguous claims. Asamera Incorporated conducted ground magnetic and electromagnetic surveys, humus and lithogeochemical surveys, and geological mapping over the entire claim group. The claims subsequently lapsed and the prospect was staked by A. Glatz (Prospector, Dryden) in late 1987.

The Minnehaha Lake Prospect is similar to the Whitewater Lake Occurrences to the north, since it is located within the Lower Wabigoon Volcanics and is in close proximity to the Manitou Straits Fault, to the east.

The workings have been sunk on fracture-controlled quartz veins hosted by massive, brecciated, pillowed, and amygdaloidal mafic metavolcanic flows. It is difficult to observe the strike of the quartz veins due to poor exposure. The veins generally consist of white to grey quartz; calcite; iron carbonate; narrow bands and fracture-fillings of both black tourmaline and chlorite; and disseminated, fine-grained pyrite and chalcopyrite. The sulphides may also occur as large blebs in the quartz.

At the main shaft, the wall rock is dark green, weakly carbonatized, chloritic, and contains disseminated pyrite and chalcopyrite at vein-wall rock contacts where there is intense shearing. Three grab samples of the quartz vein material, taken by the author from the dump at the main shaft, analyzed <2 ppb, 60 ppb, and 1350 ppb gold respectively, while a sample of pyritic wall rock analyzed 14 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

The geological relationships at the 25-foot deep test pit, a few hundred metres east of the main shaft, are the same as those at the main shaft. However, the wall rocks are more intensely altered, pale grey, carbonatized, sericitized, and contain very abundant disseminated pyrite. The rocks are sheared at the vein-wall rock contacts, but are generally massive with numerous hairline fractures. A grab sample of the pyritic wall rock, taken by the author, analyzed 5700 ppb gold, while a sample of the quartz vein analyzed 490 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto). More gold mineralization occurs in the wall rock than in the quartz vein and the alteration and appearance of the wall rocks is very similar to that occurring at the Whitewater Lake Occurrences, described previously.

The Minnehaha Lake Prospect, like the Whitewater Lake Occurrences, occurs within the large zone of structural disruption and alteration that extends north and northeast throughout the Whitewater-Kaminnassin-Turtlepond Lakes area.

Johnson–Mountdew Lake Occurrences

A number of previously unrecorded gold occurrences have recently been found by Stan and Sherridon Johnson (Prospectors, Dryden) at two localities near Mountdew Lake, about 39 km southeast of Dryden in the Boyer Lake area. The first group is situated in the vicinity of a small, unnamed lake, approximately 1.6 km north of Mountdew Lake, west of Highway 502. The other occurrences are located about 1.6 km east of the unnamed lake, east of Highway 502.

These occurrences, situated about 1.6 km east of the Manitou Straits Fault, within a thick, monotonous sequence of massive and pillowed mafic metavolcanic flows of the Boyer Lake Group, in an area cut by numerous, late, northeast-trending cross faults (Blackburn 1981), are the first gold showings to be reported in this unit. The mafic flows to the north of Mountdew Lake are intruded by numerous northeast-trending felsite dikes, quartz and quartz-feldspar porphyry dikes, and small plugs and sills of gabbro. Abundant gold mineralization occurs, and has been mined, at Goldrock, 2.0 km to the west, on the northwest side of the Manitou Straits Fault. This gold mineralization occurs within the Pincher Lake Volcanics, which is a mixed sequence of calc-alkalic to tholeiitic metavolcanics.

Shortly after the Johnsons staked their new gold occurrences, in 1986 and 1987, Abermin Corporation staked a group of claims at Mountdew Lake, south of the Johnsons' claims, and conducted geochemical and geological surveys, in 1987.

The majority of gold occurrences west of Highway 502, in the vicinity of the small, unnamed lake, consist of quartz veins and quartz stringers hosted by intensely sheared and altered, northeast-trending felsite and feldspar porphyry dikes. The dikes and mafic metavolcanic host rocks are extensively and intensely sheared at 040° to 060° trends. The mafic metavolcanics are fissile, iron carbonatized, and chloritized, and may contain pyrite, pyrrhotite, arsenopyrite, or chalcopyrite. The majority of the dikes are buff brown to white, fissile, intensely iron carbonatized, sericitized, variably silicified, and contain green mica, tiny black tourmaline needles, and 1 to 3 percent, fine-grained, disseminated pyrite. They may also contain specular hematite and chalcopyrite.

The dikes host two sets of shear and fracture-controlled quartz veins: one set consists of wide quartz-carbonate veins, which do not host gold; the other set consists of crosscutting quartz stringers that carry gold where they are pyritic (Stan Johnson, Prospector, Wabigoon, personal communication, 1987). Grab samples of the altered felsic dikes, taken by the author, analyzed between 13 ppb and 695 ppb gold, and a sample from a felsic dike, containing five percent pyrite and vugs filled with quartz crystals, assayed 0.32 ounce gold per ton. By comparison, grab samples of the altered metavolcanics, taken by the author, only analyzed as high as 80 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Gold is also hosted by interflow iron formation consisting of alternating chert and magnetite layers, which overlie and are interlayered with pillow breccia (hyaloclastite). The breccia consists of small amoeboid pillow fragments with epidote cores, and tourmaline rims. The iron formation is approximately 60 m thick and hosts actinolite, disseminated or massive pyrite, chalcopyrite, and pyrrhotite which may also occur along fractures. Two grab samples of the iron formation, taken by the author, analyzed 20 and 215 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

The occurrences east of Highway 502, about 1.6 km east of the unnamed lake, also occur in sheared and altered felsic dikes within mafic metavolcanic rocks. However, some of the dikes are brecciated, contain disseminated pyrite, pyrrhotite, and chalcopyrite, and host dark grey to black quartz veins. A grab sample, taken by the author, from a felsic dike containing ten percent pyrite, analyzed 565 ppb gold, whereas a grab sample from a brecciated dike analyzed 110 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto). Sampling by a geologist from International Platinum Corporation gave better results, with a number of samples assaying over 0.20 ounce gold per ton (Sherridon Johnson, Prospector, Dryden, personal communication, 1987).

The widespread alteration, structural disruption, and mineralization north of Mountdew Lake indicates that the area has good gold potential. The shearing and alteration extends northeast into the Boyer Lake area, where prospecting has been minimal. Old test pits, located at the northwest corner of Boyer Lake, have not recently been sampled or investigated. The pits occur within small, pyritic, and carbonatized quartz and quartz-feldspar porphyry plugs, and sheared mafic metavolcanics (Blackburn 1981).

Long Lead Prospect

The Long Lead Prospect is located in the Contact Bay area, approximately 2.0 km west of Contact Bay of Wabigoon Lake, and 400 m east of Highway 502.

The prospect is situated within massive, amphibolitized, mafic metavolcanic flows intruded by medium-grained gabbro dikes and stocks. The prospect is 800 m north of the contact between granitic rocks of the Atikwa Batholith and metavolcanic rocks of the Eagle Lake Volcanics. The Eagle Lake Volcanics consist predominantly of monotonous, massive and pillowed, mafic metavolcanic flows.

Work was reported to have been done at the Long Lead Prospect in 1917 (Thomson 1917) but no other published information is currently available, and the location of the workings was uncertain until A. Kozowy (Prospector, Dryden) rediscovered them in 1987. The American Jack Occurrence, which is supposedly located south of the Long Lead Prospect, and is reported to be hosted by granitic rocks of the Atikwa Batholith (Thomson 1917), has not been located.

The Long Lead Prospect consists of a 1.2 to 6.1 m wide shear zone striking 170° to 180° for approximately 365 m, and hosting wide (0.3 m-0.9 m), white, sugary, quartz veins and veinlets, and numerous lensoid and discontinuous quartz stringers which are intimately intermixed with the wall rocks. The majority of quartz veins do not contain significant amounts of pyrite, but are rusty and contain chlorite and hematite. Wall rocks are silicified, biotitic, variably chloritized, weakly carbonatized and contain 1-10 percent disseminated pyrite with minor chalcopyrite. Wall rocks are commonly fractured and strongly foliated but are not fissile, although narrow fissile zones do occur.

Approximately eight, deep, test pits, and a narrow open cut, have been sunk along the entire strike length of the shear zone. Grab and chip samples, taken by the author, from the majority of the test pits assayed trace to slightly/weakly anomalous gold values. A 1.5 m chip sample, taken by the author in the open cut, analyzed 120 ppb gold, while grab samples of the wall rock and quartz vein in the first test pit north of the open cut gave values of 465 ppb gold and 340 ppb gold respectively (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Grab samples of the pyritic wall rock in one of the first test-pits at the south end of the shear zone assayed 0.12, 0.14, and 0.15 ounce gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto). A. Kozowy reports (personal communication, 1987) that a grab sample he took from a quartz vein immediately north of this pit assayed 0.26 ounce gold per ton, whereas a grab sample of the quartz vein sampled by the author assayed 0.11 ounce gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Although gold mineralization is erratic and of low grade at the Long Lead Prospect, the fact that consistent gold values have been obtained from altered wall rocks is encouraging. More, careful sampling and prospecting should be done along the strike of the shear zone, especially at the south end of the zone, to determine if there is any extent to the gold-bearing wall rocks.

Longe, R. Occurrence

The Longe Occurrence is located on the northeast tip of North Twin Island in the Buchan Bay area of Eagle Lake, approximately 32.0 km west-southwest of Dryden.

The occurrence was discovered in 1949, by R. Longe, who trenched a gold-bearing quartz vein averaging one foot in width. Chip samples taken across the vein, at various intervals along an exposed strike length of 50 feet, were reported to assay 0.11, 0.12, 0.70, and 2.38 ounces gold per ton, while a grab sample of the wall rock assayed 0.03 ounce gold per ton. Visible gold was also observed in the vein (Assessment Files, Resident Geologist's Office, Kenora).

Steeprock Iron Mines Limited conducted a ground magnetometer survey and diamond drilling, in 1955, on iron formation near the occurrence. Carbonatized, sheared, mafic metavolcanics, cherts, sulphide-rich zones, and silicified zones are reported in the drill logs (Assessment Files, Resident Geologist's Office, Kenora). Unfortunately, none of the core was assayed for gold. W. Sovereign of Dryden, recently staked and sampled the occurrence, and stripped a portion of the main vein.

The occurrence consists of two sets of gold-bearing tension fracture-controlled quartz veins, one set striking 010° to 020° and the other striking 060° to 070°. The host rocks are intermediate to felsic, heterolithic pyroclastic breccias intruded by wide, north-trending, xenolithic, mafic dikes. The pyroclastic breccias contain huge blocks, consisting of mafic pillow breccia and massive magnetite, in excess of 2.4 m in width.

The main vein sampled by R. Longe is 0.3 m to 0.6 m wide, strikes 010° extending from the shore of North Twin Island into the lake, and consists of white quartz, chlorite, and tourmaline stringers, with scattered concentrations of chalcopyrite and pyrite. W. Sovereign (personal communication, 1987) obtained an assay of 0.233 ounce gold per ton from a 22 cm wide chip sample taken across the vein, but a grab sample taken by the author assayed less than 0.01 ounce gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Grab samples from other quartz veins on the property (W. Sovereign, personal communication, 1987), assayed 0.206 and 0.655 ounce gold per ton. According to Sovereign, the best gold assays are associated with chalcopyrite in the quartz veins. Grab samples from other nearby quartz veins, taken by the author, assayed 0.04 and 0.06 ounce gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto).

More prospecting on North Twin Island may indicate the presence of more, closely spaced, gold-bearing quartz veins. The presence of shear and fracture-controlled, gold-bearing quartz veins at the North Twin Island Occurrence (Parker 1986), west of the Longe Occurrence, also indicates that gold-bearing quartz veins occur elsewhere on the island. More prospecting should also be done along the granite/metavolcanic contact, which extends across the island, to search for gold-bearing veins similar to those in the southwest corner of Eagle Lake (Parker 1986), southwest of North Twin Island.

PLATINUM GROUP ELEMENTS

A compilation of data pertaining to platinum group elements, results of sampling done in 1986, and suggestions for other potential targets in the Kenora Mining Division, was presented by Hailstone and Blackburn, page 22 *in* Blackburn *et al.* (1987). In a continuation of this program, further geological work and sampling was done by office staff in three general areas: The Emo-Fort Frances-Mine Centre area; the Nabish Lake area near Dryden; and the Werner Lake-Rex Lake area, 50 km northwest of Kenora.

Emo-Fort Frances-Mine Centre Area, by M. Hailstone

Five mafic to ultramafic intrusions were investigated in 1987: The Lash-Carpenter, Devlin-Burriss, Dobie, Grassy Portage, and Bad Vermilion intrusions.

Studies of the Lash-Carpenter and Devlin-Burriss gabbros, 30 km and 20 km west of Fort Frances respectively, are hampered by sparse outcrop. These intrusions, spatially related to the Dobie Intrusion (10 km west of the Lash-Carpenter Intrusion), are gabbroic in composition. No layering or differentiation has been noted in either of these intrusions and both have been pervasively intruded by later granitic magmas that resulted in large scale brecciation and subsequent anatexis, obliterating primary igneous tex-

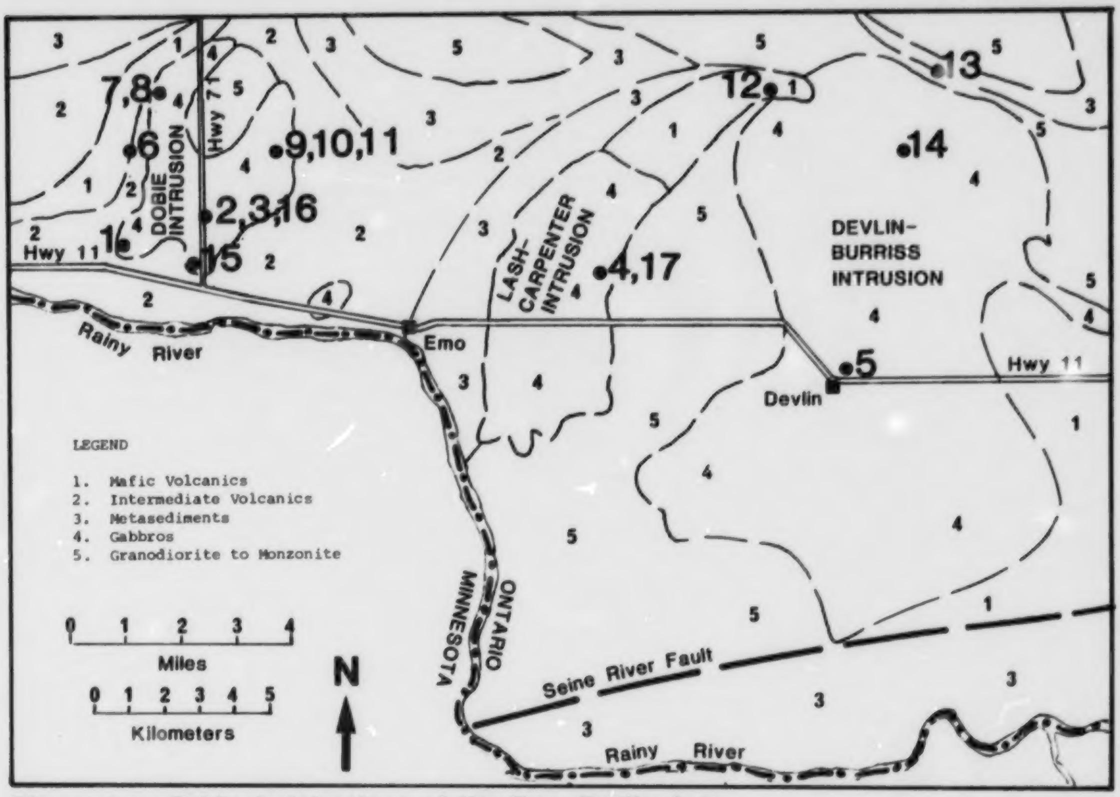


Figure 1.3. Gabbroic Intrusions of the Emo–Devlin Area

tures. Of the two intrusions, the Devlin-Burriss Intrusion has been more severely "granitized".

Davies (1973) concluded that the original rocks of the Devlin-Burriss Intrusion were two-pyroxene gabbros, but that (Davies 1973, p.10) "On the basis of the present composition, the rock would be called a diorite or, where microperthite is more abundant, a syenodiorite". An outcrop of the least-contaminated material observed by the author shows clino-pyroxene to be predominant over orthopyroxene. Black, magnetic, hornblende biotite schist xenoliths, observed in an outcrop approximately 175 m east of Highway 613 on Highway 11, may be assimilated fragments of similar magnetite hornblende biotite schist found outcropping to the northeast of the intrusion. Analyses on four samples taken by the author from the Devlin-Burriss Intrusion showed no platinum group element values of any significance (Figure 1.3, Table 1.5. Samples 5, 12, 13, 14).

The Lash-Carpenter Intrusion is less contaminated by granitic intrusion and appears to be more orthopyroxene rich than the Devlin-Burriss Intrusion. Although no layering was observed, local patches of anorthositic gabbro are found in the extreme northeastern quarter of section 34, Lash Township. Fletcher and Irvine (1954, p.17) described the unit as follows:

> "The composition throughout is about 50 to 60 percent labradorite with the remainder being augite and hypersthene. The pyroxenes are partially uralitized, and small amounts of sericite, magnetite, sulphides, and zoisite are present. The rock is a hypersthene gabbro."

Analyses performed on two samples taken by the author showed no platinum group element values of any significance (Table 1.5, Samples 4 and 17).

The Dobie Intrusion, 40 km west of Fort Frances, is somewhat better exposed than the Devlin-Burriss and Lash-Carpenter Intrusions. Most of the southern half of the intrusion lies within the boundary of Indian Reserve Number 11. Fletcher and Irvine (1954) report three differentiated phases in the intrusion: coarse-grained, diabasic gabbro (70 percent labradorite, 20 percent augite, and 10 percent hypersthene and uralite); medium-grained hypersthene gabbro (50 percent labradorite, 30 percent augite, 20 percent hypersthene and uralite); and medium-grained norite (75 percent hypersthene, calcic labradorite, and small amounts of olivine). Localized, coarse-grained pyroxenite and anorthosite occur in minor amounts. Fletcher and Irvine (1954) interpreted inclusions of fine-grained mafic rock in the border zone to represent an early chilled phase. Intrusion breccia, consisting of blocks of noritic rock in coarse-grained, diabasic gabbro, occur at the eastern end of the northern boundary of Indian Reserve Number 11. Some of the norite blocks contain up to one percent, finely disseminated pyrite and pyrrhotite. Sulphide minerals also occur on fracture surfaces. A composite grab sample from this outcrop, taken by the author, gave the following values on analysis: 17 ppb Pt, 45 ppb Pd, 296 ppm Ni, 35 ppm Cu (Table 1.5, Sample 11). A similar "xenolithic" zone outcrops where a diabase

TABLE 1.5. TRACE ELEMENT GEOCHEMICAL ANALYSES, DOBIE, LASH-CARPENTER, DEVLIN-BURRISS INTRUSIONS (ANALYSES BY GEOSCIENCE LABORATORIES, ONTARIO GEOLOGICAL SURVEY, TORONTO)

Sample Number		Au (ppb)	Pt (ppb)	Pd (ppb)	Ni (ppm)	Cu (ppm)	Cr (ppm)	Co (ppm)	Zn (ppm)	Ag (ppm)	Pb (ppm)	As (ppm)	Ba (ppm)	TiO$_2$ %	Other
1a	(K86-213)	4	<1	1			148	50							
1b	(K86-214)	<2	<1	1			144	50							
1c	(K86-215)	<2	<1	1			164	44							
1d	(K86-216)	<2	<1	3			284	46							
1e	(K86-217)	<2	<1	1			106	40							
1f	(K86-218)	5	2	6			146	55							
2	(K87-236)	<2	6	18	110	41	270					2.0			
3	(K87-237)	2	5	12	190	361	290					3.0			
4	(K87-238)	<2	<1	1											
5	(K87-239)	4	6	12											
6	(K87-252)	<2				31			42	<2	<10				
7	(K87-253)	<2	5	7	116	52	128	56	77						
8	(K87-254)	<2	<1	1	30	75	174	44	194						
9	(K87-266)	2	10	13	116	35	172	54							
10	(K87-267)	4	4	23	134	58	156	56							
11a	(K87-268)	<2	9	16	176	111	190	58							
11b	(K87-269)	2	17	45	296	35	684	58							
12a	(K87-298)	<2	<1	1	26	34	300	13							
12b	(K87-299)	<2	<1	1	5	31	353	5	87		10				
12c	(K87-300)	2	<1	1	10	74	58	18	36		10				
13a	(K87-341)	<2	<1	1	54	46	336	20							
13b	(K87-342)	<2	<1	1					87		23	1.0			
14	(K87-343)	<2	1	1					64						
15	(K87-371)	9	10	11	305	288	114	68	80		17		0.22		
16a	(K87-372)	16	16	34	290	570	177	50	77				0.25		
16b	(K87-373)	5	7	13	230	665	136	48	66				0.18		
17	(k87-374)	2	<1	<1	68	88	210	25	25		23		0.15		

dike crosses Highway 71. Analytical results from composite grab samples, taken from the road cut and from a trench 400 m west of the highway, are given in Table 1.5 (Samples 15 and 16).

The Young-Corrigan copper-nickel occurrence, at the southwestern corner of the intrusion, is hosted by norite and contains pyrrhotite, chalcopyrite, pyrite, and pentlandite as blebs, fine disseminations, massive pods, and stringers: Fletcher and Irvine (1954, p.24) reported a grab sample from the test pit, blasted into the massive sulphides, to have returned assays of 2.52 percent Ni and trace copper; and, two grab samples of disseminated mineralization gave 0.30 percent Cu, 0.31 percent Ni, 0.40 percent Cu, and 0.41 percent Ni. However, six samples taken during the 1986 program returned highest values of only 2 ppb Pt, and 6 ppb Pd (Table 1.5, Samples 1a to 1f).

Although samples taken to date from this intrusion have returned negligible amounts of Pt and Pd on analysis, further prospecting may uncover intrusion breccia with disseminated sulphides that should be analyzed for platinum group elements.

The Grassy Portage Intrusion has been described by Poulsen (1985) and Harris (1974). Mineralization at the Northrock Deposit has been described by Hodgson (1961), and sampling conducted in 1986 (*see* Hailstone and Blackburn *in* Blackburn *et al.* 1987) indicated geochemical levels of enrichment. Hodgson (1961) noted that modal layering occurs locally in the lower gabbro and upper gabbro units, but he pointed out that this is local, and is, in fact, more noticeable in the gabbro north of Highway 11. He suggested that this can be explained either by a greater degree of segregation occurring originally, north of the highway, or by erosion exposing different sections of the same level in the two areas. Sulphide mineralization is copper-rich as compared to nickel and is commonly net textured. Poulsen (1985) interpreted the sulphides to have been of magmatic origin with deuteric remobilization and alteration, followed by localized mechanical remobilization into shear zones related to regional deformation.

The Mironsky Prospect, another copper-rich sulphide occurrence that occurs in the upper gabbroic unit of the Grassy Portage Intrusion, is hosted by fine- to medium-grained, quartzo-feldspathic rock containing fine-disseminated, interstitial chalcopyrite, pyrrhotite, and pyrite. The unit measures 600 m by 25 m and has been interpreted by Poulsen (1985) to be a large metasedimentary raft, assimilated by the upper gabbro. Analysis for platinum group elements gave results in the 1 to 2 ppb range for Pt and Pd from this and other units in the Grassy Portage Intrusion; however, elevated geochemical values were found in the copper-nickel occurrences at the base of the intrusion. A grab sample taken from the dump at the Northrock Deposit ran 460 ppb Au, 150 ppb Pt, and 240 ppb Pd, whereas a composite grab sample from the Mironsky Prospect ran 75 ppb Au, 2 ppb Pt, and <1 ppb Pd (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The Bad Vermilion gabbroic to anorthositic intrusion is a northeast-trending sill which is truncated to the south by the Seine River fault; is older than and intruded to the east by the Shoal Lake trondhjemite; is intruded to the north and west by the Mud Lake trondhjemite; and, in the centre of the intrusion on the south shore of Bad Vermilion Lake, is intruded by the Bad Vermilion biotitic trondhjemite to quartz monzonite intrusion. Poulsen (1984) has suggested that this sill faces to the northwest. The shape of the anorthositic intrusion has been modified, as have other lithostratigraphic domains in the area, into lenticular, "S"-shaped patterns controlled by dextral movement on the Quetico and Seine River Faults (Poulsen 1985).

The core of the intrusion is coarse-grained anorthosite, with a width of 4000 feet and a strike length of 9 miles. The fractured crystals of plagioclase average 1 to 2 cm in diameter, but crystals of up to 5 cm in diameter have been observed. Interstitial to the plagioclase are wispy bands of chlorite that can be seen making up 10 to 15 percent of the rock. Overlying the anorthosite over a strike length of 35 km, and interpreted by Ashwal *et al.* (1983) to be comagmatic with the anorthosite, is the 100 m to 1 km wide, oxide-bearing gabbro. This unit is medium-grained and shows uralitization of clinopyroxene and saussuritization of plagioclase (Harris 1974). Within 75 to 250 m of the contact between the metavolcanics and the Mud Lake Intrusion (occurring to the north), this oxide-bearing gabbro unit hosts podiform occurrences of titaniferous magnetite. These appear to be in a stratigraphically similar position, and are related to late oxide differentiation within the Bad Vermilion Sill.

Underlying the anorthosite is a hornblende gabbro unit, which also contains magnetite-rich zones that appear to be in a stratigraphically similar position. The hornblende gabbro contains inclusions of—and is therefore younger than—the coarse-grained anorthosite. The gabbro is composed of 60 to 70 percent hornblende ophitically enclosing 30 to 40 percent plagioclase. Along its southern side, within 30 to 75 m of the magnetite horizon, the hornblende gabbro unit is in sheared contact with metavolcanics and metasediments across the Seine River Fault.

In the vicinity of the Scott Islands in Rainy Lake, a swarm of east-northeast-trending, fine-grained, frequently sheared, and anastomosing gabbroic dikes intrude the core of the anorthositic unit. These dikes are rarely more than 1 m wide and may be coeval with similar dikes cutting other units of both the Bad Vermilion complex and the Grassy Portage Intrusion. Hodgson (1961) has suggested that similar fine-grained amphibolite dikes, intruding the Grassy Portage gabbro, may be a segregated phase injected during the final stages of crystallization of the main gabbro. It is proposed that these late mafic dikes were intruded along "S"-plane foliation, and have themselves been sheared by later movement on these same foliation planes, during movement on the Quetico and Seine River Faults.

An "S"-plane shear foliation, at the head of Seine Bay, may well extend to the northwestern side of Bad Vermilion Lake, where Wood *et al.* (1980) reported the occurrence of carbonatized shears enriched in copper. A composite grab sample taken by the author from a shear zone on an island at the head of Seine

Bay, and consisting of up to 5 percent disseminated sulphide minerals in both mafic lenses and late quartz veins, gave the following analytical results: 200 ppb Au, 85 ppb Pt, 175 Pd, 366 ppm Ni, 4800 ppm Cu, 166 ppm Cr, and 0.24 percent TiO_2 (Geoscience Laboratories, Ontario Geological Survey, Toronto).

A coarse, pegmatitic, amphibole-bearing rock, occupying pockets of up to 1.5 m in diameter and as veins of up to 1 m in diameter, occurs within 200 m of the contact between the anorthosite and hornblende gabbro. The best exposure of this zone is observed on islands found in the channel midway between the two largest islands in the Scott Islands group, and on the north shore of Seine Bay, opposite Kettle Point, in Indian Reserve Number 23B. Up to one percent fine-disseminated sulphides occur in both of these localities. A sample taken by the author gave the following low values on analysis: 4 ppb Cu, 3 ppb Pt, 5 ppb Pd, 171 ppm Ni, 300 ppm Cu, 111 ppm Cr, and 1.43 percent TiO_2. These pegmatites are cut by the fine-grained gabbro dikes mentioned earlier. A large swarm of granite dikes and sills was mapped by both Harris (1974) and Wood *et al.* (1980). This swarm of granite sills and dikes was also noted on the southern-most large island in the Scott Islands, running through the centre of the island and into the mainland. A magnetic low, indicated on airborne magnetic maps (OGS 1980) as running through the centre of the hornblende gabbro north of both Bleak Bay and Little Grassy Lake, may be an expression of this granitic dike swarm.

Of further note is a chrome-rich sample taken by the author from an ultramafic intrusion occurring on a small shoal south of Sandpoint Island, and 250 m east of Powder Island. On analysis, the following values were reported: <2 ppb Au, 26 ppb Pt, 13 ppb Pd, 720 ppm Ni, 147 ppm Cu, 2540 ppm Cr, and 86 ppm Co. Samples from the hornblende gabbro adjacent to the ultramafic rock returned low values in all these elements on analysis. The ultramafic rock is also exposed on Powder Island. Day (1985) has mapped a serpentinized, chromite-bearing ultramafic intrusion on a small island northeast of Grindstone Island in Rainy Lake, approximately 5 km west of Powder Island. This occurrence was not visited by the author.

Similarities between the Grassy Portage and Bad Vermilion Intrusions lead to speculation that they share a common genesis. Poulsen (1985) has suggested the Grassy Portage Intrusion and its mineralization to be typical of many sills classified as a layered, synvolcanic, tholeiitic type by Naldrett (1981), and that the high copper/nickel ratio reflects a mafic, rather than an ultramafic, composition of the primary magma, following Naldrett (1973). Ashwal *et al.* (1983) have suggested that the Bad Vermilion anorthositic complex was a subvolcanic chamber that fed mafic melts to the surface, and that its highly aluminous, basaltic bulk composition is not representative of a primary melt. They suggest that a substantial fraction was separated from the primary melt, leaving behind the synvolcanic material of the complex, so that the primary magma was probably basaltic, similar to the Grassy Portage Intrusion.

Chromite occurrences associated with anorthosite complexes that carry platinum (for example, the Duluth Complex (Sabelin 1987)) appear to be missing from the Bad Vermilion Lake Intrusion, and, in particular, from the Fe-Ti oxide zones. However, up to three percent disseminated chalcopyrite, pyrrhotite, and pyrite occur in dump material at a shaft on the Fe-Ti oxide zone at the western end of Seine Bay; prospecting in this horizon for platinum group elements is recommended. Furthermore, the lower oxide horizon, in which up to one percent chalcopyrite and pyrite is disseminated (with up to two percent pyrite occurring in fractures), is worth prospecting for platinum group elements.

The Seine River Fault, with its associated carbonate alteration, should be tested for both gold and platinum group elements since it cuts the hornblende gabbro along its southern contact, close to the lower oxide zone. Furthermore, the Seine Bay Shear Zone (extending from the head of Seine Bay northeastward along the northwestern shore of Bad Vermilion Lake) may have been a locus for hydrothermal systems that were suitable for the deposition of platinum group elements and gold; it is recommended for prospecting.

The late, east-northeast-trending dikes, cutting both the Bad Vermilion and Grassy Portage Intrusions, should be sampled for platinum group elements, where they contain sulphide minerals.

Nabish Lake Copper-Nickel Occurrences by J. Parker

The Nabish Lake Gabbro, 13 km south-southwest of Dryden in the Contact Bay area, is an irregular, generally north-trending intrusion which extends southward from Nabish Lake to Osbourne Bay of Eagle Lake. The gabbro is in contact with a granitic lobe of the Atikwa Batholith in the east, west, and south and intrudes mafic and intermediate metavolcanics in the north and northwest. Copper-nickel occurrences are situated in the northern part of the gabbro in the vicinity of Nabish Lake.

Exploration for copper and nickel was conducted at Nabish Lake, in the intervals 1956 to 1958 and 1966 to 1971, by approximately ten mining companies, which conducted ground geophysical surveys, mapping, sampling, and some diamond drilling. The northern part of the gabbro is presently staked as a result of the recent interest in platinum mineralization. St. Joe Canada Incorporated has staked north and east of Nabish Lake, and Mr. A. Kozowy (Prospector, Dryden) has staked west and south of the lake.

The northern part of the gabbro at Nabish Lake consists dominantly of medium- to coarse-grained melanogabbro. This melanogabbro contains xenoliths of the surrounding mafic metavolcanics, and inclusions and dikes of very coarse-grained, chloritized, pyroxenite. Davies (1966) noted pods or dikes of very coarse-grained, mafic pegmatites and rhythmic layering occurring over widths of several metres. He described the layers as being a few centimetres wide, poorly defined, and sinuous, with light-coloured layers containing 80 percent felsic minerals and darker layers containing 60 percent felsic minerals.

The southern part of the gabbro is intimately intruded by granodiorite, and, according to Davies (1966), does not display any primary features. The gabbro consists of clinopyroxene, orthopyroxene, and plagioclase with the majority of pyroxenes variably altered to amphibole. The gabbro also contains lesser amounts of ilmenite and magnetite. Davies (1966) noted that all the rocks were variably altered by sericitization, epidotization, and chloritization.

As stated previously, all of the copper-nickel occurrences are situated in the northern part of the intrusion. The occurrences commonly consist of disseminated chalcopyrite, pyrrhotite, and pentlandite, ranging up to to 25 percent in abundance. The majority of host rocks consist of massive, weakly foliated, altered melanogabbro. Some narrow shear zones within the gabbro also host sulphides.

The South Nabish Occurrence (also known as the Kozowy–Latin American Mines Limited Occurrence) is situated due south of Nabish Lake. Variable amounts of sulphide minerals are disseminated throughout the gabbro. Grab samples taken from old test pits by the author analyzed 36, 37, 38, 66, 68, 73, 77, 78, and 84 ppb platinum and 23, 40, 48, 71, 47, 79, 2, 4, and 70 ppb palladium respectively, with one sample assaying 130 ppb platinum, 100 ppb palladium, and 100 ppb gold. All of the analyses listed above were accompanied by anomalous gold values ranging from 21 to 85 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto). Three grab samples, taken by A. Kozowy, from other locations south of Nabish Lake analyzed 90 ppb gold, 100 ppb platinum, 89 ppb palladium for one sample; 145 ppb gold, 49 ppb platinum, 37 ppb palladium for the second sample; and, 40 ppb gold, 61 ppb platinum, 3 ppb palladium for the third sample (Ontario Geological Survey, Geoscience Laboratories, Toronto).

The Nabish Lake Occurrence (also known as the Johnston–Jeness Occurrence) is located east-southeast of Nabish Lake, and consists of sulphides in sheared, altered gabbro near the gabbro–granite contact. Grab samples of the sulphide mineralization have returned assay values of 1.56 percent copper and 0.3 percent nickel but the occurrence has not been analyzed for platinum (Shklanka 1969).

The Kozowy–Nabish Lake Occurrences, northwest and west-northwest of Nabish Lake, are located along the northwestern boundary of the gabbro at the gabbro-metavolcanic contact. The sulphides occur within an intrusion breccia consisting of numerous, amphibolitized xenoliths of metavolcanic rocks in a coarse-grained, gabbroic to dioritic matrix consisting dominantly of amphibole and feldspar. Grab samples of the sulphide-rich rocks have returned assay values of up to 3 percent nickel and 0.5 percent copper (Shklanka 1969). Platinum and palladium values for four grab samples taken from the test pits, by the author and A. Kozowy, were generally low and analyzed 23, 28, 37, and 87 ppb platinum and 21, 46, 44, and 70 ppb palladium respectively (Ontario Geological Survey, Geoscience Laboratories, Toronto).

A sulphide-mineral occurrence, southwest of Nabish Lake, consisting of pyrrhotite, pyrite, and chalcopyrite in gabbro and amphibolitized mafic metavolcanic rocks was sampled by the author, but no platinum and palladium analyses values were obtained.

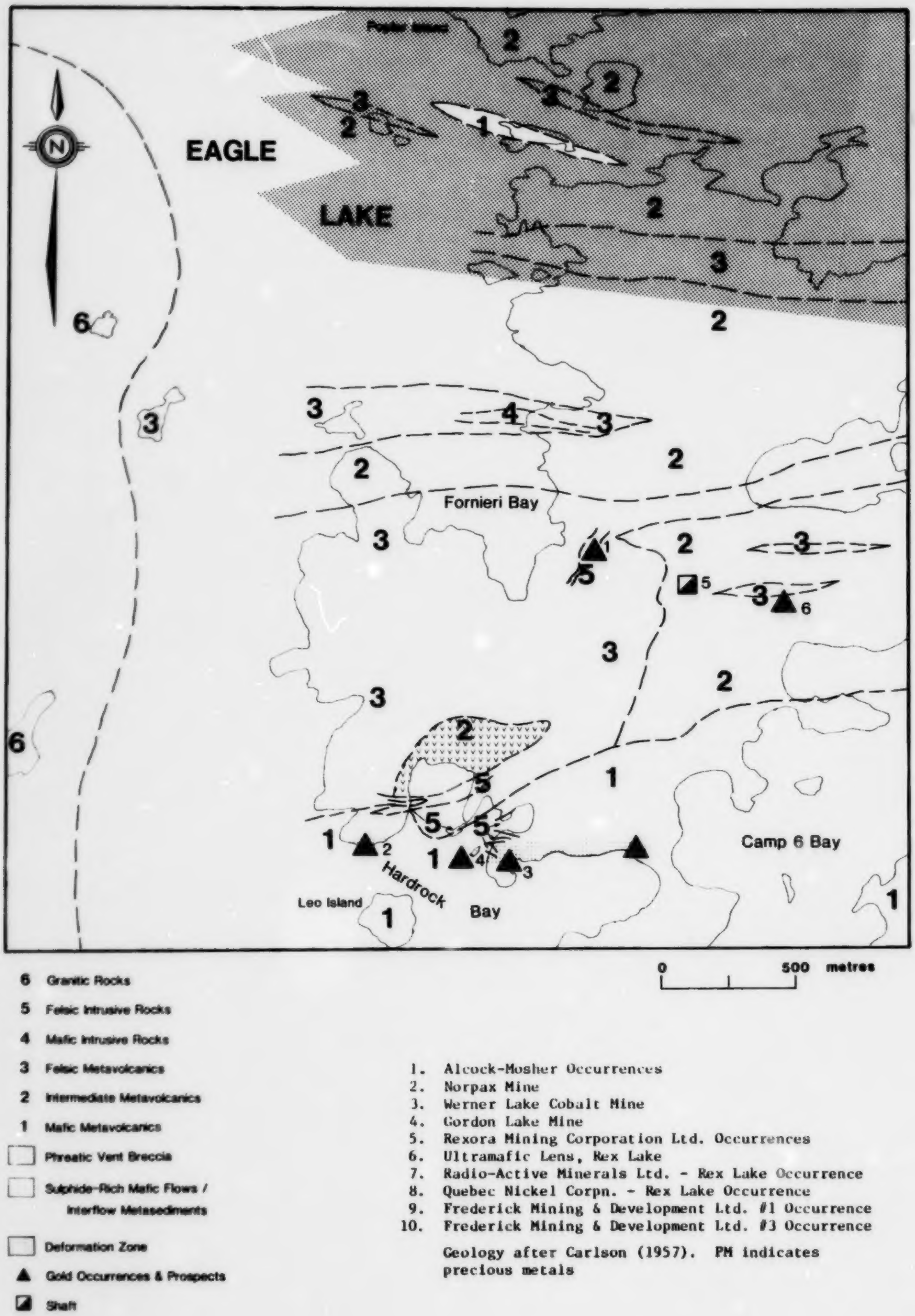
The northern part of the Nabish Lake Gabbro may have some platinum potential due to the presence of abundant, disseminated sulphides and elevated platinum values. Rhythmic layering, observed by Davies (1966), may also have some significance with regards to platinum. Davies (1966) also determined, from 19 samples taken from the intrusion, that the Nabish Gabbro contains average values of 400 ppm chromium, 285 ppm nickel, and 67 ppm copper. The chromium and nickel values are higher than those found in average gabbros and may have increased due to the alteration of pyroxenes to amphibole. This is a secondary, rather than primary, enrichment.

Werner Lake–Rex Lake Lineament by C.E. Blackburn and G. Vogg

Subsequent to discussion by Hailstone and Blackburn *in* Blackburn *et al.* (1987) of the platinum group elements potential of the Werner-Rex Lakes area (Figure 1.4), located 50 km northwest of Kenora, considerable interest has been aroused in this belt. A number of companies have carried out reconnaissance exploration in the area, and two companies have obtained options on ground staked in the Rex Lake portion of the Werner Lake-Rex Lake Lineament (Falconbridge Limited and International Platinum Corporation). Much of the western portion of the belt is held under patent, including the past-producing Gordon Lake nickel-copper mine of Consolidated Canadian Faraday Limited (Figure 1.4, Locality 4), and the Werner Lake cobalt mine of Falconbridge Limited (Figure 1.4, Locality 3).

Platinum group element values were first recorded in 1948 (Assessment Files, Resident Geologist's Office, Kenora). Subsequently, between 1963 and 1969, 4223 ounces of platinum and 32 030 ounces of palladium were produced as a by-product at the Gordon Lake copper-nickel mine, from 1 325 115 tons of milled ore. Since the closure of several mines that had occurred in this belt, little interest had been expressed in their potential for either base or precious metals, largely because of the discontinuous nature of the ore-bearing host rocks. Geological mapping by Carlson (1958) had indicated the presence of a number of east-trending, steeply dipping, subparallel faults; along a number of these occur ultramafic lenses, interpreted by Carlson (1958) to be plugs, which were forcefully intruded into the banded amphibolite host rocks.

Considerable evidence for low, but consistent, analytical values in platinum and palladium, from numerous ultramafic lenses in the western portion of the belt, have been obtained over the years. For example, at the Alcock–Mosher Occurrences at Almo (or Tigar) Lake (Figure 1.4, Locality 1), Selco Exploration Company Limited, in 1953 (Assessment Files, Resident Geologist's Office, Kenora), obtained assays of up to 0.02 ounce platinum (Pt) per ton and 0.02 ounce palladium (Pd) per ton from three separate localities along a one and a half mile stretch. Recent sampling by the authors at "Selco's A" show-


N
EAGLE
LAKE
Fornieri Bay
Camp 6 Bay
Leo Island
Hardrock
Bay
0
500 metres
6 Granitic Rocks
5 Felsic Intrusive Rocks
4 Mafic Intrusive Rocks
3 Felsic Metavolcanics
2 Intermediate Metavolcanics
1 Mafic Metavolcanics
Phreatic Vent Breccia
Sulphide-Rich Mafic Flows / Interflow Metasediments
Deformation Zone
▲ Gold Occurrences & Prospects
◪ Shaft

1. Alcock-Mosher Occurrences
2. Norpax Mine
3. Werner Lake Cobalt Mine
4. Gordon Lake Mine
5. Rexora Mining Corporation Ltd. Occurrences
6. Ultramafic Lens, Rex Lake
7. Radio-Active Minerals Ltd. - Rex Lake Occurrence
8. Quebec Nickel Corpn. - Rex Lake Occurrence
9. Frederick Mining & Development Ltd. #1 Occurrence
10. Frederick Mining & Development Ltd. #3 Occurrence

Geology after Carlson (1957). PM indicates precious metals

Figure 1.4. Geology and mineral occurrences of the Eagle Lake Area.

ing of a peridotite with disseminated chalcopyrite and pyrite returned analyses of 100 ppb Pt and 760 ppb Pd. At the Norpax Oils and Mines Limited nickel-copper prospect (Figure 1.4, Locality 2), assays on grab samples obtained from dump material gave combined platinum-palladium values of up to 7210 ppb, comprising 210 ppb Pt and 7000 ppb Pd (J.D. McCannell, Consultant Geologist, Norpax Oils and Mines Limited, personal communication, 1986). At the Werner Lake cobalt mine, from which in excess of 140 000 pounds of cobalt were produced in 1932 and from 1940 to 1944, assays running 0.01 ounce platinum per ton and 0.07 ounce palladium per ton were reported from a grab sample taken by E.O. Chisolm (1949). Scoates (1963, Table 40) reported platinum and palladium values from twenty sulphide ore samples, taken from the underground workings at the Gordon Lake Mine, that returned highest values of 2.74 ounces platinum per ton and 5.60 ounces palladium per ton. In a recent compilation of analyses of characteristic ore samples from copper-nickel ores across Canada, Jonasson *et al.* (1987) report mean analytical values (3 samples) of 1165 ppb Pt and 4385 ppb Pd from the Gordon Lake Mine. Farther to the east of the Gordon Lake Mine (Figure 1.4, Locality 5) from an ultramafic lens at Rexora Mining Corporation Limited's No. 3 Occurrence, grab samples containing disseminated chalcopyrite and pyrrhotite were taken by the authors yielding up to 210 ppb Pt and 800 ppb Pd, and at Rexora Mining Corporation Limited's No. 4 Occurrence, similar samples analyzed up to 135 ppb Pt and 510 ppb Pd.

Evidence of anomalous platinum group elements concentrations at the eastern end of the belt, in the vicinity of Rex Lake, has been fragmentary and ambiguous. A number of companies, including Quebec Nickel Corporation Limited, in 1953; Eastern Mining and Smelting Corporation Limited, in 1956; and Canico, in 1962, conducted diamond-drill programs at a number of places along the northern shore of the lake, testing rusty sulphidic zones associated with magnetic and electromagnetic expressions. Notable among this work were values of up to 0.75 ounce precious metals per ton (*see* explanatory note, this paragraph), obtained from diamond-drill core as reported by Eastern Mining and Smelting Corporation Limited (Assessment Files, Resident Geologist's Office, Kenora). At one of the occurrences opposite the exit of Winding River from Rex Lake (Figure 1.4, Locality 8), 0.44 ounce precious metals per ton was obtained for a drill intersection of 78.5 feet, and 0.31 ounce precious metals per ton (*see* explanatory note, this paragraph) was obtained for an intersection of 7.5 feet, both assays having been derived from two, separate holes. At Frederick Mining and Development Limited's No. 1 Occurrence (Figure 1.4, Locality 9), 0.36 ounce precious metals per ton were obtained over 4.0 feet from one of three holes drilled. At Frederick Mining and Development Limited's No. 3 Occurrence (Figure 1.4, Locality 10), 0.20 ounce precious metals per ton were obtained over 5.0 feet from one of two holes drilled. (Explanatory note: Because of analytical techniques used at the time, and the method of reporting, it is uncertain whether the values above, reported as ounce precious metals per ton, refer to platinum group elements alone, or to combined precious metals, including gold and silver, or to silver alone.).

In order to help resolve a few of the outstanding problems, a brief, one-day, reconnaissance of the Rex Lake Occurrences was conducted late in the 1987 field season, prior to the commencement of diamond drilling operations by Falconbridge Limited and International Platinum Corporation. At the occurrences opposite the exit of Winding River, samples were taken of a variety of rock types, including the following: rusty, biotite-bearing paragneiss, ± garnet (Figure 1.4, Locality 8); an unmineralized, prominent, ultramafic lens, consisting of a central core of pyroxene peridotite, and a marginal zone varying from hornblende-feldspar rich to biotite-hornblende rich to biotite rich (Figure 1.4, Locality 6); and a mineralized lens, with a peridotite phase containing disseminated chalcopyrite and fracture-filling pyrrhotite, and an amphibolitite phase (Figure 1.4, Locality 7). Geochemical analyses for gold, silver, platinum, and palladium indicated that, except for one sample, none of these rocks contained above-background values in any of these metals; in fact, many ran below the detection limit (<2 ppb for Au, <1 ppb for both Pt and Pd, and <2 ppm for Ag) in all these metals. However, one sample of biotite paragneiss from Locality 8 analyzed 645 ppb Au. At Frederick Mining and Development Limited's No. 3 Occurrence (Figure 1.4, Locality 10), rusty gneiss was sampled. All samples contained negligible gold, silver, platinum, and palladium as inferred from geochemical analysis.

Investigation of the sampled ultramafic rocks, occurring along the north shore of Rex Lake (Figure 1.4, Locality 6), suggested that the peridotitic central core is of primary origin, whereas the marginal-zone rocks represent varyingly altered phases, in contact and reacting with their gneissic host. Pinching and swelling of the ultramafic lenses, observed in particular at Radio-Active Minerals Limited's Occurrence (Figure 1.4, Locality 7) where chalcopyrite is disseminated in a peridotite host, suggests the boudinage of a formerly larger and more continuous body, possibly sheet-like in form.

Regional airborne magnetic surveys (ODM-GSC 1962), compiled at a 1:63 360 (1 inch to 1 mile) scale, indicate a broad, east-trending magnetic grain. Because any ultramafic lenses that might occur are small in dimension and aligned along narrow lineaments, they do not give a detectable signature at this scale. The long, curvilinear nature of many of the lakes in the belt, and, in particular, Werner and Rex Lakes, has led workers to interpret them to be fault defined; however, both the broad magnetic signature and the geological mapping of Carlson (1958) at Rex Lake suggests that the paragneiss belt cuts obliquely across the eastern end of the lake with little to no apparent offset. The few ground magnetic and electromagnetic surveys completed over the lake suggest this also. Base-metal sulphide occurrences are known at Bug Lake, two miles southeast of Rex Lake (Assessment Files, Resident Geologist's Office, Kenora). The geological environment of these is poorly understood, and their platinum group element content has not been investigated.

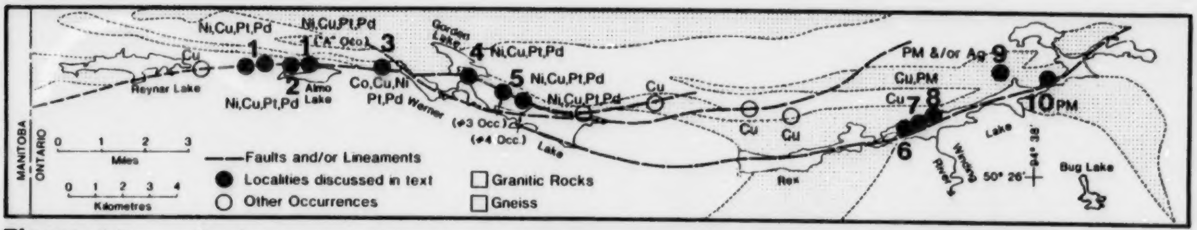

Ni,Cu,Pt,Pd
Ni,Cu,Pt,Pd
"A" Occ.
Gordon Lake
Ni,Cu,Pt,Pd
1
1
2
3
4
5
Cu
Reynar Lake
Ni,Cu,Pt,Pd
Atmo Lake
Co,Cu,Ni
Pt,Pd
Werner
Ni,Cu,Pt,Pd
Ni,Cu,Pt,Pd
(#3 Occ.)
(#4 Occ.)
Lake
Cu
Cu
Cu
PM &/or Ag
9
Cu,PM
Cu
7
8
6
10
PM
Rex
Lake
50° 26'
94° 38'
Bug Lake
MANITOBA
ONTARIO
0 1 2 3
Miles
0 1 2 3 4
Kilometres
Faults and/or Lineaments
Localities discussed in text
Other Occurrences
Granitic Rocks
Gneiss

Figure 1.5. Geology and mineral occurrences along the Werner–Rex Lake Lineament.

The control on ultramafic lenses occurring along the length of the Werner-Rex Lake Lineament is not clearly understood, despite numerous studies, most of which have been site specific. It is by no means proven that the lenses are plugs, intruded into faults, as suggested by Carlson (1958) and other workers. More likely, faulting, subsequent to emplacement of mafic-ultramafic, sill-like intrusions, utilized a ductility contrast between the sill-like intrusions and their gneissic host. This initiated extension and, ultimately, boudinage of the original body. If this is the case, then the possibility exists that other ultramafic lenses, so far undetected, may exist along the lineament and also within the surrounding gneissic terrain in general—not necessarily on pronounced lineaments. The fact that to date no such lenses have been discovered distant from the Werner–Rex Lakes belt further supports the hypothesis of dismemberment of a once larger body.

EAGLE LAKE MAPPING PROJECT

by J. Parker

The Fornieri Bay-Hardrock Bay area on Eagle Lake lies approximately between latitudes 49°38'N and 49°42'N and longitudes 93°11'W and 93°14'W in the District of Kenora, and covers an 11.52 km^2 area which is 3.47 km wide by 3.32 km long. Fornieri Bay, in the middle of the map area, and Hardrock Bay, in the south, are about 29 km southwest of Dryden. The area is accessible by boat from several public boat launches on the northern and eastern shores of Eagle Lake. J. Parker, assisted by T. Engler and A. Schottroff, conducted a geological survey in 1987, using a base map prepared, at a scale of 1:4800 (1 inch to 400 feet), by enlargement from a Forestry Resources Inventory Map, with corrections made from a vertical air photograph enlarged to the same scale.

GOLD EXPLORATION

Gold exploration and development had begun at Eagle Lake by 1900, where a number of gold occurrences were located along the granite-metavolcanic contact in the southwestern part of the lake. Attempts to develop these discoveries into mines failed, except for the Baden-Powell Mine located on South Twin Island (immediately west of the map area), which produced 288 ounces of gold between 1902 and 1905 (Mineral Deposits Files, Resident Geologist's Office, Kenora).

Gold was discovered at Fornieri Bay (Figure 1.5, No. 1) in 1935 when S.S. Fornieri staked fifteen claims for the Kirkland Lake Prospectors' Syndicate. The claims were subsequently optioned to Erie Canadian Mines Limited, who conducted extensive prospecting, trenching, and sampling.

During 1936, W.W. "Hardrock" Smith had staked several claims at Hardrock Bay (Figure 1.5, No. 2 and 3) and was obtaining "heavy pannings" from 300 feet of trenching he had completed on the northern shore of the bay. The Smith claims were known as the Smith-Goldale Option. Birch Bay Gold Mines Limited optioned the W.W. Smith claims in 1936 and conducted extensive mapping, trenching, and sampling. During 1938, the company drilled nine holes, totalling approximately 1768 feet, targeted on seven showings found on the claims. One hole, drilled immediately northeast of Iron Island (also known as Rock Island) (Figure 1.5, No. 4) in Hardrock Bay, intersected 0.10 ounce gold per ton across 40 feet in sulphide-rich mafic metavolcanic flows. A hole drilled beneath some large trenches at the northwestern corner of the property intersected 1.46 ounces gold per ton across 5 feet in "rhyolite intruded by tiny quartz stringers" (Assessment Files, Resident Geologist's Office, Kenora). However, most of the holes encountered narrow intersections of low grade gold mineralization.

In 1948, Magdalena Red Lake Mines Limited optioned the Hardrock Bay and Fornieri Bay claims from prospectors who had restaked the area in 1947. The company conducted stripping, trenching, sampling, mapping, and ground magnetometer and self-potential (SP) geophysical surveys. Encouraging results were not obtained from the Fornieri Bay claims, but at Hardrock Bay the company delineated a 2000-foot long by 100-foot wide sulphide-rich zone in mafic metavolcanic flows hosting isolated gold values. In 1949, the company drilled six holes, totalling about 1551.2 feet, and followed up with five holes being drilled in 1951, which totalled about 1427 feet (Assessment Files, Resident Geologist's Office, Kenora).

In 1973, Barringer Research Limited conducted ground magnetometer and induced-polarization (I.P.) geophysical surveys, and geological mapping for Kamlo Gold Mines Limited on twenty-two claims the company had acquired at Fornieri Bay. During 1975, the company drilled seven holes, totalling 1063 feet, targeted on I.P. survey delineated conductors. Some of the drillholes intersected wide sections of anomalous copper and silver values, such as 0.05 to 0.41 ounce silver per ton and 0.432 percent copper across widths ranging between 5 and 50 feet (Assessment Files, Resident Geologist's Office, Kenora). However, the majority of holes were drilled down dip.

Raleigh Resources Limited presently have the Fornieri Bay Prospect under option and have conducted both S.P. ground geophysical surveys and diamond drilling on the claims since 1981. As of 1987, the company had drilled nineteen holes, totalling 5615 feet, targeted on S.P. survey delineated anomalies. Most of the holes intersected wide zones of anomalous copper and silver values with some encouraging gold assays (Assessment Files, Resident Geologist's Office, Kenora). It should be noted, however, that the majority of holes were drilled parallel to stratigraphy and to the strike of shear and fracture zones.

Tasu Resources Limited optioned nine patented mining claims, encompassing the W.W. Smith Prospect, and staked an additional twenty-four claims in the vicinity of Hardrock Bay in 1982. The company conducted ground magnetometer and horizontal-loop electromagnetic geophysical surveys over the claim group. In 1983, the company drilled six holes along the northern shore of Hardrock Bay, totalling approximately 3133 feet, targeted on old trenches and geophysical targets. In 1984, three holes totalling 990.5 feet were drilled in the vicinity of Iron Island in Hardrock Bay. The majority of the drillholes encountered narrow intersections of anomalous and low grade gold mineralization within sulphide-rich, mafic metavolcanic flows. The first drillhole from the 1983 drill program intersected 0.22 ounce gold per ton across 10 feet, including a smaller section which assayed 0.54 ounce gold per ton across 3.3 feet (Assessment Files, Resident Geologist's Office, Kenora).

No work has been conducted on the Fornieri Bay Prospect, presently held by Raleigh Resources Limited, since 1985. The W.W. Smith Prospect is presently under option to Noranda Exploration Company Limited, who have also optioned a large group of contiguous claims which extend eastward from Hardrock Bay to Buchan Bay.

GENERAL GEOLOGY

The Fornieri Bay–Hardrock Bay area was previously mapped by W.W. Moorhouse (1941), as part of the Eagle Lake map sheet, and was included in a M.Sc. Thesis (University of Toronto) undertaken by S.F. Leaming (1948). The Eagle Lake area was included in a regional study conducted by the Ontario Geological Survey in 1977 (Trowell *et al.* 1977; Trowell *et al.* 1980).

A large portion of the map area is situated within a mixed tholeiitic to calc-alkalic sequence of mafic to felsic metavolcanics, grouped together as the Lower Wabigoon Volcanics. These overlie the Eagle Lake Volcanics, a thick sequence of tholeiitic, massive, and pillowed mafic metavolcanic flows. The Eagle Lake Volcanics are situated in the southern part of the map area, at Hardrock and Camp 6 Bays. The contact between the Eagle Lake and Lower Wabigoon Volcanics trends easterly, through the northern part of Camp 6 Bay, and trends southwesterly through Hardrock Bay (Figure 1.5). The metavolcanics are bounded by the Atikwa Batholith, to the south and west, and the Wabigoon Fault, to the north, and generally face homoclinally northward. The volcanic rocks are metamorphosed to greenschist facies.

The metavolcanics in the map area can be subdivided into the following three map groups: mafic, intermediate, and felsic. Factors such as colour of the fresh surface, colour of the weathered surface, hardness, visible quartz content, and mafic mineral content were used to assign them to their respective categories.

The metavolcanic rocks consist predominantly of intermediate and felsic crystal tuff with lesser amounts of heterolithic lapilli-tuff, tuff-breccia, pyroclastic breccias, and minor lensoid units of felsic and mafic flows. The pyroclastic rocks overlie massive and pillowed mafic flows, some of which contain thin discontinuous lenses of interflow metasediments consisting of interlayered siltstone and chert. The metavolcanics are intruded by massive and porphyritic fine to medium-grained gabbro dikes and sills and a variety of fine-grained and porphyritic felsic dikes. The granitic rocks of the Atikwa Batholith intrude the metavolcanic assemblage at the west boundary of the map area (*see* Figure 1.5).

The majority of pyroclastic rocks in the Fornieri Bay–Hardrock Bay area consist of thick sequences of intermediate and felsic crystal tuffs. These consist of broken crystal fragments (1 to 8 mm in size) of quartz, feldspar, and mafic minerals in a very fine-grained matrix composed of quartz and feldspar. The felsic crystal tuffs consist predominantly of feldspar and quartz fragments while the intermediate crystal tuffs contain predominantly feldspar and mafic mineral fragments. Both felsic and intermediate crystal tuffs contain a minor component of accessory lapilli-sized mafic clasts. The crystal tuffs are interlayered with narrow units of coarser, heterolithic pyroclastics and commonly contain abundant disseminated pyrrhotite and chalcopyrite (up to three percent).

The most abundant coarse pyroclastic rocks occur in the north part of the map area where they consist of intermediate, moderately to poorly sorted, monolithic and heterolithic, thickly to very thickly bedded tuff-breccia, pyroclastic breccia, and lapilli-tuff, which are interlayered with crystal tuff. The pyroclastics consist of subrounded to angular, intermediate and felsic clasts, with accessory mafic clasts embedded in a matrix of fine-grained, green-gray, intermediate crystal tuff. Most of the pyroclastics consist of 80 to 95 percent clasts and may be clast-supported with a large proportion of bombs and blocks. The ratio of lapilli-sized clasts to bombs and blocks is rarely gradational, changing abruptly between layers.

Intermediate, heterolithic pyroclastics also occur due north of Camp 6 Bay in the southeast corner of the map area (Figure 1.5). These chaotic, poorly sorted and unbedded rocks consist of coarse, subrounded to subangular felsic and mafic clasts. The felsic clasts are generally composed of aphanitic rhyolite and crystal tuff while the mafic clasts are fine-grained, massive, and vesicular. Thin lensoid units of felsic quartz-feldspar crystal tuff occur within the pyroclastics. To the north and west, the coarse pyroclastics grade into finer pyroclastics consisting of interlayered lapilli-tuff and feldspar crystal tuff. The pyroclastics also have a limited lateral extent of approximately 1.6 km and terminate abruptly in the east and west. The pyroclastic unit is in contact with felsic quartz-feldspar crystal tuffs along its western contact (*see* Figure 1.5). Mapping by Moorhouse (1941), indicates that the coarse pyroclastics interdigitate with massive mafic flows along their eastern boundary. The limited lateral extent of the coarse pyroclastic unit, and its heterolithic, chaotic character, indicates that it probably represents a proximal deposit.

An unusual, small, elliptical unit of intermediate, heterolithic, tuff-breccia occurs immediately north of Hardrock Bay (*see* Figure 1.5). The pyroclastics consist of poorly sorted, chaotic, subrounded to angular clasts with a great variation in clast composition. The clasts consist of felsic and intermediate crystal tuff, rhyolite, black "glassy" material, fine-grained mafic material which may or may not contain feldspar phenocrysts, and mafic igneous rocks. Many of the clasts have been fractured and altered prior to deposition. The unit is devoid of matrix and is entirely clast-supported. Pyrrhotite and chalcopyrite (<1 percent) are finely disseminated throughout the crystal tuff clasts. These features suggest that it is a vent breccia resulting from a phreatic explosion. The vent breccia, which is part of the Lower Wabigoon Volcanics, is situated immediately above the underlying mafic metavolcanic flows of the Eagle Lake Volcanics.

Minor, coarse, felsic, pyroclastics occur in the north part of the map area. They consist of lapilli-tuff with minor tuff-breccia and are similar to the intermediate pyroclastics, except that they contain more abundant felsic fragments and a felsic matrix.

A few felsic flows were mapped on two small reefs and an island, in the northern part of the map area (*see* Figure 1.5). The flows are a lensoid unit within intermediate, heterolithic, tuff-breccias, and consist of massive rhyolitic flows and spectacular coarse autoclastic breccias with well-developed flow-banding. The flows weather buff to white, are aphanitic to porphyritic with numerous small (<2 mm) quartz phenocrysts, and are strongly sheared.

The majority of the mafic metavolcanic rocks are confined to the south part of the map area, at Hardrock and Camp 6 Bays (*see* Figure 1.5). with the exception of two small lensoid units of pillowed, massive, and porphyritic mafic flows in the northern part of the map area. The mafic metavolcanics at Hardrock and Camp 6 Bays occur at the top of the Eagle Lake Volcanics.

The mafic metavolcanics consist of dark green-gray, fine-grained, pillowed, brecciated, and massive flows, with massive, coarse-grained flows occurring at Hardrock Bay. The pillows are typically small (0.6 m to 0.9 m) and rounded, with narrow selvages, small vesicles concentrated along pillow rims, and small amygdules filled with quartz and calcite. At Hardrock Bay, the pillowed flows contain abundant interpillow breccia, amygdules filled with epidote and pyrrhotite, and have a distinctive olive green or rusty brown weathered surface. The mafic flows at Hardrock Bay are very hard and fracture conchoidally, which has been attributed to silicification. However, petrographic investigations by the author indicate that the rocks contain very minor quartz, but are intensely epidotized with large amounts of disseminated epidote, and clinozoisite or zoisite. The epidotization may be responsible for the hardness of the mafic rocks and their olive green appearance.

Massive mafic flows on the west side of Leo Island, south of Hardrock Bay (*see* Figure 1.5), have been biotitized and intensely altered. The mafic rocks contain ragged biotite crystals, felted masses of actinolite, and abundant leucoxene and clinozoisite or zoisite. The fibrous actinolite clots weather out, leaving "pockmarked" surfaces on outcrops.

Pillowed and massive fine- to medium-grained, epidotized, mafic flows containing up to 50 percent disseminated sulphides also occur at Hardrock Bay (*see* Figure 1.5). These flows are overlain and underlain by pillowed and massive coarse-grained flows which contain only minor amounts of sulphides (<1 percent). The sulphide-rich flows are gold-bearing and have been traced, by the author, 600 m east from Iron Island along the northern shore of Hardrock Bay. This is the same sulphide-rich unit which was previously delineated by Magdalena Red Lake Gold

Mines Limited, in 1948 (Assessment Files, Resident Geologist's Office, Kenora). The sulphide-rich flows may extend to Midway Point, approximately 1.6 km southwest of the map area. Sulphide-rich flows associated with cherty interflow metasediments are exposed in trenches on the west side of Midway Point. It is possible that this occurrence may be at the same stratigraphic level as the sulphide-rich flows at Hardrock Bay.

The sulphide-rich flows are underlain by thin, discontinuous lenses of interflow metasediments consisting of thickly laminated to very thinly bedded chert and siltstone, which are draped over underlying pillowed and coarse-grained flows. The metasediments display well-developed graded bedding and small ball-and-pillow structures. The metasediments have been previously mapped and described as iron formation (Moorhouse 1941) but very minor amounts of magnetite were found by the author. The majority of the metasediments host less than one percent finely disseminated pyrite, with some thin layers of pyrite in the cherts. Although interflow metasediments can be found amongst mafic flows stratigraphically above and below the sulphide-rich flows, the majority of interflow metasediments are spatially associated with the sulphide-rich flows.

Numerous east- or northeast-trending felsic dikes occur throughout the map area, but the majority are concentrated at Hardrock Bay. They consist of feldspar porphyry, quartz porphyry, quartz-feldspar porphyry, aphanitic felsite, and glassy rhyolite dikes.

The glassy, rhyolite dikes generally occur in the vicinity of Fornieri Bay and are massive, hard, and pink, white, or pale green-yellow, with "flow-banding" parallel to their contacts. The quartz porphyry dikes contain rounded to subhedral quartz phenocrysts, ranging in size, from less than 1 mm to 1.5 cm, embedded in a glassy or sugary textured felsic matrix. The feldspar and quartz-feldspar porphyry dikes are very similar to the quartz porphyries except that phenocrysts are more abundant, and the dikes are wider. The felsite dikes are wide, massive, hard, milky white or pink, and commonly host disseminated pyrrhotite and chalcopyrite. The dikes have an aphanitic, sugary texture but are not glassy. The dikes intrude the quartz porphyry and feldspar porphyry dikes at Hardrock Bay.

A wide, east-northeast-trending feldspar porphyry dike hosting numerous angular pyroxenite xenoliths occurs at the north end of Hardrock Bay. The dike is situated immediately below the phreatic vent breccia described previously (*see* Figure 1.5). Ultramafic rock units have not been identified within the map area, so that the source of the xenoliths is unknown.

East- and north-trending, fine- to medium-grained, massive, feldspar porphyritic gabbroic dikes also occur throughout the area and intrude all rock types. These dikes are commonly wide, dark green, and massive, and are concentrated at Fornieri Bay. Mafic dikes are common along the northern shore of Hardrock Bay, where they intrude the phreatic vent breccia. An intrusive gabbro-breccia dike was mapped in Hardrock Bay, on the small island immediately north of Iron Island. The dike consists of large rounded fragments of massive, medium-grained gabbro, embedded in a fine-grained mafic matrix containing abundant euhedral feldspar phenocrysts.

Structural Geology

The metavolcanic rocks in the Fornieri Bay–Hardrock Bay area have an easterly strike. Pillows and sedimentary structures consistently face north, except at Hardrock Bay, where a small anticlinal fold, plunging 070° to the east, occurs within interflow metasediments. The metavolcanics are pervasively but variably foliated with a west- or west-northwest regional trend in the north, and east-northeast trend in the south. Lineations plunge steeply to the west or southwest.

A wide west-northwest-trending zone of deformation, dipping steeply to the northeast, extends through the northern part of the map area (*see* Figure 1.5). The zone has been traced to the east of the map area by the author, and has a strike length in excess of 7.0 km. Rocks within the deformation zone are intensely sheared, fissile, sericitized, and intensely iron carbonatized. Sulphides have not been found, and quartz veining throughout the deformation zone is minimal. Clasts in pyroclastic rocks have been flattened, and numerous, narrow, anastomosing sericitic shear planes occur throughout the deformed felsic rocks. The orientation of shear bands, and secondary shear bands, in a mylonitized felsic flow indicates dextral movement along the deformation zone. Vertically plunging S- and Z-shaped kink folds, with predominantly northwest orientations, occur within the deformation zone.

A relatively undeformed and unaltered lensoid unit of pillowed and massive mafic flows, surrounded by intensely deformed intermediate and felsic metavolcanics, occurs within the deformation zone. The mafic rocks may have resisted deformation due to their lower ductility than the more felsic rocks.

Within the deformation zone, the author has noted intermediate and felsic pyroclastic rocks which have been "sheared" into each other, resulting in discontinuous, irregular, interdigitating contacts; this relationship may also be due to folding.

Numerous, narrow, linear shear zones, with limited strike lengths, occur throughout the area and generally strike east- or east-northeast in the vicinity of Fornieri and Camp 6 Bays, and northeast at Hardrock Bay. These shear zones occur in all rock types, and at lithologic contacts.

The majority of metavolcanic rocks in the southern and central parts of the map area appear relatively undeformed, with minimal shearing. However, inspection of drill core and slabbed rock pieces from Hardrock and Fornieri Bays, indicates that the metavolcanic rocks have been disrupted by intense hairline fracturing (<1 mm wide) with no predominant orientation. Displacement has occurred along the fractures which were subsequently filled with quartz, sulphides, and calcite. Locally, the rocks appear brecciated and intensely disrupted.

The intrusive, felsic and mafic rocks within the map area may have been emplaced into structures with predominantly east, north, and northeast orientations. A number of flat-lying or very shallow-dipping feldspar porphyry dikes occur at Hardrock Bay, where they have been emplaced into horizontal structures. Inspection of drill core from holes drilled by Tasu Resources Limited, immediately northeast of Iron Island in Hardrock Bay, indicate that a large "wedge" of intrusive feldspar porphyry has been displaced into the gold-bearing, sulphide-rich mafic metavolcanics. An irregular, angular contact between the feldspar porphyry and the mafic metavolcanics, observed in drill core by the author, may represent a fault contact along which the porphyry was displaced.

Economic Geology

Gold mineralization at Fornieri Bay (*see* Figure 1.5, No. 1) is hosted by shear- and fracture-controlled quartz veins, and quartz stringer zones, in felsic metavolcanic and intrusive rocks; and by slightly fractured felsic metavolcanic rocks hosting disseminated sulphides. At Hardrock Bay (*see* Figure 1.5, No. 2, 3, 4), gold is associated with massive and pillowed sulphide-rich mafic flows and interflow metasediments. Sampling by the author has also indicated that gold is hosted by pyritic, sheared, felsic and intermediate metavolcanic rocks near Camp 6 Bay. The rocks are intensely altered and sheared in the wide deformation zone in the northern part of the map area (*see* Figure 1.5) but do not host significant sulphide or gold mineralization.

The majority of trenching and sampling at Fornieri Bay (*see* Figure 1.5, No. 1) was conducted less than 100 m inland, along the eastern shore. Although it was difficult to observe geological relationships within the numerous trenches, due to poor exposure, the author noted numerous narrow, fracture-hosted quartz veins and veinlets occurring throughout the felsic and intermediate crystal tuff host rocks. Previous descriptions of the quartz veins by Erie Canadian Gold Mines Limited indicate that the majority are fracture-hosted, lensoid, and discontinuous (Assessment Files, Resident Geologist's Office, Kenora). At the most extensively trenched zone (*see* Figure 1.5, No. 1), gold-bearing, fracture-controlled quartz veins are hosted by a wide, quartz porphyry dike intruding felsic crystal tuffs. Moorhouse (1941) indicated that gold values were obtained from four, wide, generally east-trending quartz veins, and from two large lenticular zones of quartz stringers.

The majority of quartz veins and stringers consist of white and blue-grey quartz containing less than one percent total sulphides consisting of disseminated pyrrhotite, pyrite, minor chalcopyrite. Moorhouse (1941) observed small amounts of visible gold and bismuthinite within the larger quartz veins.

Host rocks at Fornieri Bay contain up to 5 percent disseminated pyrrhotite and pyrite. Alteration is not obvious on weathered outcrop surfaces but is well defined in drill core. Host rocks containing disseminated sulphides, hairline fractures, and quartz veining, are pale grey to buff brown-grey, due to sericitization, calcium carbonate alteration, and moderate silicification. Feldspar fragments in the crystal tuffs are sericitized and less distinguishable in the alteration zones. Many of the fractures and quartz veins are surrounded by narrow, alteration haloes in which sericitization and carbonatization impart a pale grey appearance to the host rocks.

Extensive chip sampling in the trenches, by Erie Canadian Mines Limited, indicates that most of the gold mineralization is, at best, low grade, with rare, narrow, high grade zones assaying up to 1.54 ounces gold per ton (Assessment Files, Resident Geologist's Office, Kenora). The best assay from ten chip samples, taken by the author from the quartz veins and stringer zones exposed in the main trenched area, was 280 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto). Holes drilled by Kamlo Gold Mines Limited and Raleigh Resources Limited, in the vicinity of the trenches, have intersected felsic crystal tuffs hosting wide intervals of abundant (4 to 5 percent) pyrrhotite, chalcopyrite, and pyrite, in quartz-carbonate veinlets, along fractures, and disseminated throughout the metavolcanics. These sulphide-rich zones have anomalous to low ore grade, gold, silver, and copper contents (Assessment Files, Resident Geologist's Office, Kenora).

Other large trenches east of Fornieri Bay have been sunk on shear zone hosted quartz veins ranging in thickness from 0.3 m to 1.2 m. The narrow shear zones occur within intermediate and felsic crystal tuff, and generally strike west-northwest, dipping steeply to the south. The host rocks are intensely sheared, sericitized, and carbonatized. They are pyritic (up to 15 percent) with minor chalcopyrite and pyrrhotite. The quartz veins contain dark green chlorite and iron carbonate, with up to four percent sulphides. The veins are lenticular and discontinuous, and pinch and swell along their strike lengths. Tension fracture-hosted quartz veins, within the shear zones, generally strike east-northeast or east-west. The best gold analyses from grab samples, taken by the author, from quartz veins in the trenches, were 165 ppb gold and 890 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Exploration at Hardrock Bay has been concentrated on the gold-bearing, sulphide-rich mafic metavolcanic flows which extend east from Iron Island, along the northern shore of the bay (*see* Figure 1.5). Gold mineralization is associated with dark green, massive and pillowed, fine- to medium-grained mafic flows containing 5 to 50 percent disseminated pyrrhotite, and pyrrhotite with minor chalcopyrite concentrated along hairline fractures. Pyrrhotite is also concentrated in pillow selvages, interpillow breccias and amygdules.

Pyrrhotite is the most abundant sulphide mineral in these rocks, and combined with chalcopyrite, makes up 90 percent of the sulphides in the mafic metavolcanics. Leaming (1948) estimated that the ratio of pyrrhotite to chalcopyrite was 10 to 1. Minor amounts of pyrite, marcasite, and sphalerite have been identified, under the microscope, in polished sections of samples taken from Iron Island (Leaming 1948). Visible gold occurs as small flakes along quartz-filled hairline fractures (<3 mm) within the sulphide-rich mafic flows, and in small blebs and flakes intimately associated with the disseminated sulphides. Leaming (1948) observed gold, associated with chalcopyrite, and isolated blebs of gold scattered amongst gangue minerals, in polished sections of samples from Iron Island.

Alteration of the mafic metavolcanics consists of epidotization, chloritization, and saussuritization of feldspars with the presence of clinozoisite or zoisite, epidote, fibrous actinolite, chlorite, and minor carbonate. The rocks are generally moderately to intensely altered. Petrographic work and whole-rock analysis of the gold-bearing, sulphide-rich flows indicate the absence of secondary silicification and carbonatization.

Two grab samples taken by the author from intensely fractured, sulphide-rich, mafic metavolcanics, in a large trench on a peninsula west of Iron Island, assayed 1.0 and 1.12 ounces gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto). Assays from chip samples, taken by Magdalena Red Lake Gold Mines Limited from trenches throughout the sulphide-rich zone, range between 0.02 to 0.48 ounce gold per ton across widths up to 60 feet (Leaming 1948; Assessment Files, Resident Geologist's Office, Kenora). Other encouraging assay values, mentioned previously, have came from core drilled by Birch Bay Gold Mines Limited and Tasu Resources Limited (Assessment Files, Resident Geologist's Office, Kenora).

Anomalous gold mineralization is associated with interflow metasediments which occur immediately below the sulphide-rich mafic flows. Although pyrrhotite and chalcopyrite occur along hairline fractures in some of the metasediments, the higher gold values have been obtained from metasediments hosting very fine-grained, finely disseminated pyrite. Grab samples, taken by the author, have analyzed up to 275 ppb gold (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Gold mineralization is also associated with sheared felsic and intermediate metavolcanic rocks northwest of Camp 6 Bay, where a deep, timbered shaft is located (*see* Figure 1.5, No. 5). No previous documentation concerning the shaft or its location is available. It may have been developed during the 1930s when Ventures Limited held claims in the area (Assessment Files, Resident Geologist's Office, Kenora). The shaft has been sunk on sheared, sulphide-rich, intermediate to felsic, monolithic lapilli-tuff consisting of angular rhyolitic clasts embedded in a feldspar crystal tuff matrix. The metavolcanics in the vicinity of the shaft are sericitized, carbonatized and silicified, and contain pyrite and chalcopyrite disseminated throughout the matrix. No quartz veins, or quartz vein material, were observed at the shaft. The metavolcanics are extensively sheared, commonly fissile, and intensely altered. Grab samples from the shaft and surrounding sheared rocks, taken by the author, assayed trace amounts of gold. However, a grab sample taken by the author from strongly sheared, sericitized, and slightly pyritic feldspar crystal tuff, 245 m due east of the shaft (*see* Figure 1.5, No. 6), assayed 0.39 ounce gold per ton (Ontario Geological Survey, Geoscience Laboratories, Toronto).

Summary and Conclusions

Gold mineralization is widespread throughout the Fornieri Bay–Hardrock Bay area. It is associated with disseminated sulphides in metavolcanic rocks consisting of intermediate to felsic crystal tuff, lapilli-tuff, and mafic flows. Abundant widespread fracturing and minor shear zones control the majority of gold-bearing quartz veins. Gold also occurs in pyritic, altered metavolcanic rocks deformed by widespread shearing. The major deformation zone in the northern part of the map area (Figure 1.5) has not, to date, been shown to host significant sulphide or gold mineralization.

A stratiform unit of sulphide-rich mafic metavolcanic flows overlying interflow metasediments, is the host for gold mineralization at Hardrock Bay. The mafic flows are apparently no different from surrounding flows, except that they are mineralized with sulphides and gold. The underlying metasediments host anomalous levels of gold.

It has been suggested that the auriferous chert and siltstone were deposited amongst mafic flows during hiatuses in the basaltic volcanism of the Eagle Lake Volcanics, prior to the felsic volcanism of the Lower Wabigoon Volcanics (*see* Parker, pages 12-18, *in* Blackburn *et al.* 1987). It is also possible that the majority of the sulphides, and possibly the gold, were deposited synvolcanically with the sulphide-rich mafic flows. These flows are a discrete unit extruded at a specific stratigraphic level within the mafic metavolcanic sequence, immediately after a hiatus in basaltic volcanism.

The sulphides and gold in the metavolcanic rocks are spatially associated with an eruptive centre. The sulphide-rich mafic flows at Hardrock Bay occur a few hundred metres below a phreatic vent breccia, within the Lower Wabigoon Volcanics. At Fornieri Bay, anomalous amounts of sulphides and gold are disseminated throughout the crystal tuffs which overly the vent breccia.

The close spatial relationship between widespread gold mineralization and proximal volcanic rocks occurs elsewhere within the Lower Wabigoon Volcanics, and in the general Dryden area. Gold is associated with eruptive centres at Flambeau Lake (*see* Parker, pages 20-41 *in* Blackburn *et al.* 1986; pages 12-18 *in* Blackburn *et al.* 1987), at Upper Manitou Lake (Blackburn 1979, 1982), and in the vicinity of Stormy Lake (Blackburn 1981). All of the volcanic centres are situated within mixed sequences of tholeiitic to calc-alkalic metavolcanic rocks, which are a locus for gold mineralization throughout the Kenora–Dryden–Fort Frances region (Blackburn and Hailstone 1983; Parker and Blackburn 1986). The spatial association between gold, eruptive centres, and mixed metavolcanic sequences may indicate a temporal relationship as well. Gold may have been deposited in volcanic rocks proximal to rising felsic volcanic arcs during predominantly calc-alkalic volcanism.

DIAMOND–DRILL CORE STORAGE PROGRAM

The Kenora Drill Core Library serves the three mining divisions in northwestern Ontario: Kenora, Patricia (Sioux Lookout), and Red Lake. Core stored consists of entire drillholes from both exploration and mine development drilling, incomplete holes recovered from old drill sites, and short samples of core submitted for credit under Section 77(6) of the Mining Act (RSO 1980). Some of the core has been relogged and sampled by drill core library staff.

Core collected from December 1, 1986, to November 30, 1987, consists of 33 051.3 m: 20 197.7 m from Kenora, 3416.6 m from Red Lake and 9437.0 m from Patricia. The total amount of completely catalogued core, to November 30, 1987, is 29 750.1 m: 20 235.0 m from Kenora, 3205.1 m from Red Lake and 6310.0 m from Patricia. The large amount from the Kenora Mining Division is the result of direct donation to the library, of core from local diamond-drill projects. Considerable amounts of core from the Patricia and Red Lake Mining Divisions were prepared during the summer and fall of 1987, in preparation for retrieval after freeze-up. Not all core collected has been entered into the catalogue system. Excess core from several drill projects that were collected in their entirety, plus core that has been culled from the system, and surplus core, after some holes were relogged and reduced, are kept in secure, dead storage for future reference.

Use of the core library by industry has grown since 1986, and the number of users who examined core has increased dramatically. A total of 80 visits were made by exploration industry personnel, and other private-sector individuals, in 1987. Forty-five mineral-industry personnel visited the library and examined core, or made other use of its facilities, and another twenty-three acquainted themselves with services offered. Four group tours were given, including Junior Rangers from the Ministry of Natural Resources, and a school group from Morris, Manitoba. Many of the visits by mineral industry personnel that involved examination of core, lasted several days. Four Ontario Geological Survey project geologists examined core from the collection. Core from the Eagle Lake area was relogged by Kenora Resident Geologist's Office staff, in conjunction with the Eagle Lake mapping project. Ontario Geological Survey field party personnel made extensive use of the rock saws and the laboratory, for hand specimen preparation and staining.

The core collected has been largely related to gold exploration, although, because of current interest in platinum, core has been donated from several projects exploring for this commodity. Several visitors have inspected core, from former copper-nickel projects, that was not analyzed for platinum group elements. Much of the core collected to date has been drilled within the last five years.

From older projects, the core library has the last remaining core from the Gordon Lake nickel-copper mine of Consolidated Canadian Faraday, and from the Griffith iron mine near Ear Falls. Complete holes, drilled between 1970 and 1972, representative of the Sturgeon Lake base-metal mine of Minnova Incorporated (formerly Corporation Falconbridge Copper), are stored at the library. Core from several older drill projects in the Sioux Lookout area, including the Pidgeon Molybdenum Deposit, and gold properties in Echo and Pickerel Townships near the Goldlund Mine and Camreco Properties, was added to the collection in 1987. Core has been obtained from International Platinum Corporation's Big Trout Lake platinum exploration project; and several representative drillholes from the vicinity of the Mattabi and Lyon Lake massive sulphide deposits have been collected.

Core from gold deposits near Pickle Lake (Power Explorations Incorporated, Ateba Mines Incorporated, Kerr Addison Mines Limited, Central Patricia Explorations, and Gallant Gold Mines Limited) has been obtained. Some of the drill core from the latter two projects is stored in Sioux Lookout.

Most of the core from the Red Lake Mining Division comes from gold exploration projects in the immediate vicinity of Red Lake. Notable exceptions to this are the Griffith Mine core, and core from a group of holes drilled by Selco Mining Corporation Limited, related to massive-sulphide deposits west of the past-producing South Bay base-metal mine.

In addition to use by mineral exploration industry personnel, drill core, and other rock materials, stored in the Kenora Drill Core Library are playing an increasingly important role in research carried out both by staff of the Kenora Resident Geologist's Office, and by the Ontario Geological Survey. Increasing use of the core library by mineral industry personnel is leading to a greater appreciation of the potential of the program. Occasionally, major discrepancies have been noted between drill logs, to be found in the Assessment Files, and the rock types and mineralization actually present in the corresponding core, available in the core library. By keeping these hard-won geological specimens for re-evaluation, or reinterpretation, the Kenora Drill Core Library will continue to make a valuable contribution to mineral exploration throughout northwestern Ontario.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

During the 1987 field season, the following field parties from the Engineering and Terrain Geology, and Precambrian Geology sections operated within the Kenora Mining Division:

A. Bajc (Engineering and Terrain Geology Section) continued surficial geological mapping, and supervised an overburden-drilling project in the Fort Frances–Rainy River area (Figure 1.2, Location A).

J.A. Ayer (Precambrian Geology Section) continued detailed mapping (1:15 840) in the Chisholm Island area of Lake of the Woods (Figure 1.2, Location B).

B.R. Berger (Precambrian Geology Section) continued detailed mapping (1:15 840) near Dinorwic, in Laval and Hartman Townships. In conjunction with this work L.B. Chorlton (Precambrian Geology Section) continued a study of mineralization in the general area north of Dinorwic (Figure 1.2, Location C).

S. Buck (Precambrian Geology Section) began a regional study of structure and metallogeny in the Lake of the Woods area (Figure 1.2, Location D).

G.W. Johns (Precambrian Geology Section) conducted bedrock mapping 1:100 000) in the Straton–Rainy River area (Figure 1.2, Location E).

M. Morrice (Precambrian Geology Section) continued detailed mapping (1:15 840) in the Windigo Islands area of Lake of the Woods (Figure 1.2, Location F).

M. Sanborn-Barrie (Precambrian Geology Section) conducted lithologic and structural mapping of the Atikwa Batholith (Figure 1.2, Location G).

P.M. Smith (Precambrian Geology Section) continued a study of metallogenesis in the northern Lake of the Woods area (Figure 1.2, Location H).

The above projects were funded jointly by Energy, Mines and Resources Canada and the Ontario Ministry of Northern Development and Mines under the Canada–Ontario Mineral Development Agreement (COMDA) Subsidiary Program.

J. Lawson and P. Zuberec (Precambrian Geology Section) conducted a study of the platinum group element, cobalt and gold potential of the Gordon Lake–Werner Lake area (Figure 1.2, Location I).

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

As of the end of November, 1987, designated OMEP programs, by 21 companies or individuals, and on which a total of $1.5 million in assistance is anticipated, were operative in the Kenora Mining Division.

RESEARCH BY OTHER AGENCIES

UNIVERSITY THESES

Geological theses related to the Kenora Mining Division, believed to be in progress or completed, during 1987, are as follows:

Bachelors Theses:

Charbonneau, H.: Commenced a petrographic and geochemical study of amphibolite facies alteration in an intermediate, alkalic, pillowed sequence at Shoal Lake (University of Western Ontario, London).

Kormos, S.: Commenced a study of gold mineralization at Gull Island on Lake of the Woods (Queen's University, Kingston).

Powell, W.: Commenced a study of gold mineralization at the Gold Mountain Property on Lake of the Woods (University of Toronto, Toronto).

Masters Theses:

Smith, P.M.: Completed a study of the geological setting of the Duport Gold Mine of Consolidated Professor Mines Limited, at Shoal Lake (University of Waterloo, Waterloo).

Warman, T.: Commenced a study of the geochemistry, sedimentology, and history of sedimentation of the red varved clays at Dryden (University of Manitoba, Winnipeg).

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

R.P. Taylor, D.M. Watkinson, and D.H. Melling, all of Carleton University, conducted geological, fluid inclusion, and isotopic studies of gold-bearing vein systems in the Cameron Lake and Monte Cristo shear zones (Grant 323).

OTHER RESEARCH

H. Poulsen, Geologist, Southern Minerals Section, Mineral Resource Division, Geological Survey of Canada (GSC), conducted four research projects in the Fort Frances–Mine Centre area, under the federal component of COMDA.

H. Poulsen, Geologist, Southern Minerals Section, Mineral Resource Division, Geological Survey of Canada (GSC); I. Derome, M.Sc. Student, Exeter University, England; and R. Bromecker, M.Sc. Student, University of Waterloo, commenced geological mapping (1:50 000) along the Quetico Fault in the Bennett Lake area.

G. Skippen, Professor, Department of Geology, Carleton University and L. Dymond, Post-doctoral Fellow, Department of Geology, Carleton University, conducted a study on alteration associated with gold veins in the trondhjemite sill south of Mine Centre, in the Bad Vermilion Lake area.

H. Poulsen, Geologist, Southern Minerals Section, Mineral Resource Division, Geological Survey of Canada (GSC), commenced a study of sulphur-selenium ratios and their bearing on platinum group element potential in the Grassy Portage Intrusion.

D. Davis, J. Satterly Lab, Royal Ontario Museum, and H. Poulsen, Geologist, Southern Minerals Section, Mineral Resource Division, Geological Survey of Canada (GSC), collected samples for geochronology.

G.V. Minning, Geologist, Geological Consultants Limited, continued the 1:50 000 scale Quaternary mapping program of National Topographic System Map Sheet NTS 52F, begun by D. Cowan, Geologist, Palliser Consultants Limited in 1987. This program is being carried out under the federal component of the Canada–Ontario Mineral Development Agreement (COMDA).

Frank Luther, Professor of Geology, University of Wisconsin, commenced study of a regionally extensive diabase dike in the Whitefish Bay area, Lake of the Woods.

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2. Red Lake Resident Geologist's Area—1987

M.J. Lavigne Jr.[1] **and B.T. Atkinson**[2]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Red Lake

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Red Lake

INTRODUCTION

Exploration activity in the Red Lake District has more than doubled in 1987, in comparison to 1985 and 1986, and has quadrupled that of the previous three years. There were more than 70 diamond-drill programs (482 000 feet) and three underground exploration projects. Most past producing gold mines and prospects with underground development are being reevaluated. As the result of these efforts, there has been one significant discovery. Financing for most of these projects has come from flow-through shares.

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

In 1987, the office of the Resident Geologist was staffed by M.J. Lavigne Jr., Resident Geologist; B.T. Atkinson, Staff Geologist; and C. Krueger, Clerk. Permanent staff was complimented by a number of contract staff: H. Kowalchuk, Clerk; J. Smith, Clerk; C. Krakowski, Clerk; C. Delaney, Field Assistant; and G. Soberman, Contract Geologist.

B.T. Atkinson and M.J. Lavigne Jr., in preparation for an Open File Report on the gold occurrences in the Birch-Confederation Lakes Greenstone Belt, visited almost every gold occurrence in the belt. Most of the gold occurrences in the Sandy Lake Greenstone Belt were also visited. This program involved finding leads from an in-depth search of files and reports and interviewing property owners and old timers about the location of trenches and pits, veins, and mineralization. These occurrences were field checked, described, sampled, and assayed. As a result of this work, a compilation map has been produced (Figure 2.3).

M.J. Lavigne Jr. mapped the Red Lake Greenstone Belt at a reconnaissance scale in search for high strain zones. As a result of this program, five new high strain zones have been identified and boundaries on previously known zones have been located, resulting in realignment. From this study, two exploration recommendations can be made.

RECOMMENDATIONS FOR EXPLORATION

The level of exploration activity precludes making many recommendations as most properties in the Red Lake belt are currently active. However, the areas underlain by two of the recently defined high strain zones are currently partially open, and the areas staked are not being actively explored. These two high strain zones, coincident with the alteration zones, are found in the southwestern portion of Fairlie Township and the southeastern portion of Todd Township (Figure 2.2). The longest of these two zones, the Wolf Bay Zone, is 10 km in length and is at the contact between a succession of greywackes, iron formation, and felsic tuff to the north, and mafic volcanic rocks to the south. The mafic volcanic rocks along this contact are bleached for a thickness of 150 m. These bleached mafic volcanic rocks were originally mapped as intermediate volcanic rocks by Riley (1978) but have been re-examined and interpreted to be altered mafic volcanic rocks (H. Wallace, Chief, Geoservices Section, Ontario Geological Survey, personal communication). This alteration does not include carbonate but likely involves the movement of alkalies. Outcrops at the eastern end of this high strain zone are strongly foliated and carbonate altered. Only one large outcrop of highly strained mafic volcanic rock has been located near the west end, as the entire length of this zone has yet to be examined. Thus, the presence of alteration, high strain, and several gold occurrences along this contact make this a good grass roots type of exploration target.

The second high strain zone, the Middle Narrows Zone, has been traced for 3 km. The mafic volcanic rocks in this zone are commonly strongly foliated, striking from 110° to 135°. Pillows and amygdules are elongated. In one location, alteration and shearing was intense enough to transform the mafic volcanic rocks into a crudely layered rock with abundant aluminosilicates bearing some resemblance to the host rocks at the Madsen Mine. Although no gold occurrences exist within the zone, it is worthy of investigation for potential Madsen-style gold mineralization.

There are many dormant properties in the Red Lake area which, in the past, have had underground exploration. These properties warrant reevaluation. Examples are the Cole, May-Spiers, and the Miles Properties. The Gold Eagle, Madsen, and Starratt-Olsen Mines are examples of dormant past producers.

MINING ACTIVITY

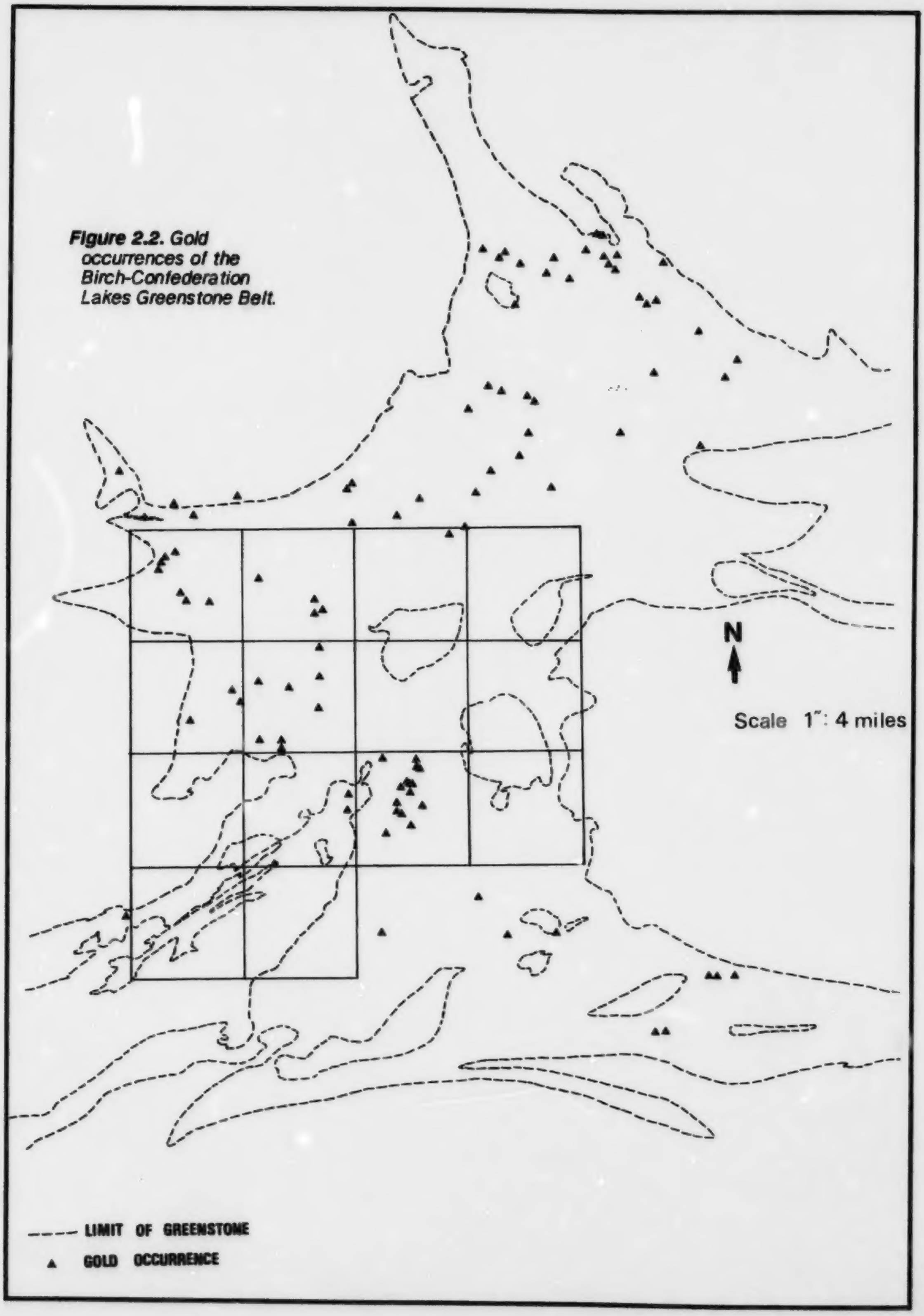
Two mines are currently in production in the Red Lake area, the Campbell Red Lake Mine (Placer-Dome Inc.) and the A.W. White Mine (Dickenson-Sullivan Joint Venture). Late in 1986, Goldquest Explorations Inc. shipped 2586 tons of ore from the Abino Mine site to the A.W. White mill and recovered 1353 ounces of gold for an average grade of 0.52 ounce gold per ton. This production is added to the 1984 production of 44 ounces from 147 tons to produce the new production figures on Table 2.2. In 1986, Goldquest also had milled 3916 tons of ore from the Rowan Lake mine site, processed at the A.W. White mill, to produce 276 ounces of gold. An average grade of 0.07 ounce gold per ton reflects mixing with waste rock and not the ore grade at the mine site. For example, a stock pile of 2601 tons at the mine site has an average grade of 0.34 ounce gold per ton and the drill-indicated reserves are 49 562 tons grading 0.79 ounce gold per ton (uncut) down to 400 feet.

Production at the Campbell Red Lake Mine is expected to be 229 750 ounces of gold from 398 000 tons. In 1987, Campbell Red Lake Mines Limited completed a 10 percent expansion of milling capacity

TABLE 2.1. PROPERTY VISIT

1.	Blackwater Bay Occurrence, Muskrat Dam Lake	Cu
2.	Fox Bay Occurrence, Muskrat Dam Lake	Cu
3.	Tulley-Burten Occurrence, Sandy Lake	Au
4.	Canadian Occidental Petroleum Ltd., 4 Occurrences Sandy Lake	Au
5.	Dubeau - Dussault Occurrence, Sandy Lake	Au
6.	New Sulphide Occurrence, Sandy Lake	Cu
7.	Blondin Occurrence. Mink Lake	Au
8.	Finn Occurrence, Mink Lake	Au
9.	Hatch-Mink Lake Group Occurrence, Mink Lake	Au
10.	Hatch-Alcon Occurrence, Mink Lake	Au
11.	Graham Occurrence, Joneston Lake	Au
12.	Casey Mountain Occurrence, Richardson Lake	Au
13.	Ellen Occurrence, Richardson Lake	Au
14.	Moran Pond Occurrence, Richardson Lake	Au
15.	Moran Occurrence, Richardson Lake	Au
16.	Kostynuk (Past Producer) Richardson Lake	Au
17.	Boylen East Group Occurrence, Birch Lake	Au
18.	Jason Mine (Post Producer) Occurrence, Casummit Lake	Au
19.	Johnston-Dynes Occurrences, Birch Lake	Au
20.	Springpole Portage Occurrence, Birch Lake	Au
21.	Dole Brothers Occurrence, Springpole Lake	Au
22.	Hanson Occurrence, Birch Lake	Au
23.	Brengold Occurrence, Casummit Lake	Au
24.	Duration Mines Occurrence, Birch Lake	Au
25.	Exit Bay Occurrence, Birch Lake	Au
26.	Harris Swain Cavans Occurrence, Birch Lake	Au
27.	McIntyre Bay Occurrence, Birch Lake	Au
28.	McGregor Occurrence, Birch Lake	Au
29.	McKenzie Red Lake Gold Mines-Hanson Option Occurrence	Au
30.	Jackson Manion North Occurrence, Woman Lake	Au
31.	Suprise Lake Occurrence, Suprise Lake	Au
32.	Ontario Woman Lake Occurrence, Woman Lake	Au
33.	Desmeules Occurrence, Quartz Lake	Au
34.	Costello Occurrence, Bear Lake	Au
35.	Bear Lake Occurrence	Cu
36.	Medicine Rock Occurrence	Cu
37.	Guest Occurrence, Swain Lake	Cu
38.	Golden Hope Resources Ltd. Property, Woman Lake	Au
39.	Western Pacific Energy Corp. Property, Woman Lake	Au
40.	Greenstar Resouces Ltd. Property, Swain Lake	Au
41.	Blanchard Occurrence, Ball Twp.	Au
42.	West Red Lake Propspect, Ball Twp.	Au
43.	Soltermann Property, Todd Twp.	Au
44.	Piper Red Lake Occurrence, Todd Twp.	Au
45.	Skookum Bay Property Prospect, Dome Twp. Heyson Twp.	Au
46.	Campbell Red Lake Mine, Producer, Balmer Twp.	Au
47.	A. W. White Mine, Producer, Balmer Twp.	Au
48.	Char-Lar-Mar, Property, Heyson Twp.	Au
49.	McFinley Red Lake Mine, Prospect, Balmer Twp.	Au

Figure 2.2. Gold occurrences of the Birch-Confederation Lakes Greenstone Belt.


N
Scale 1": 4 miles
LIMIT OF GREENSTONE
▲ GOLD OCCURRENCE

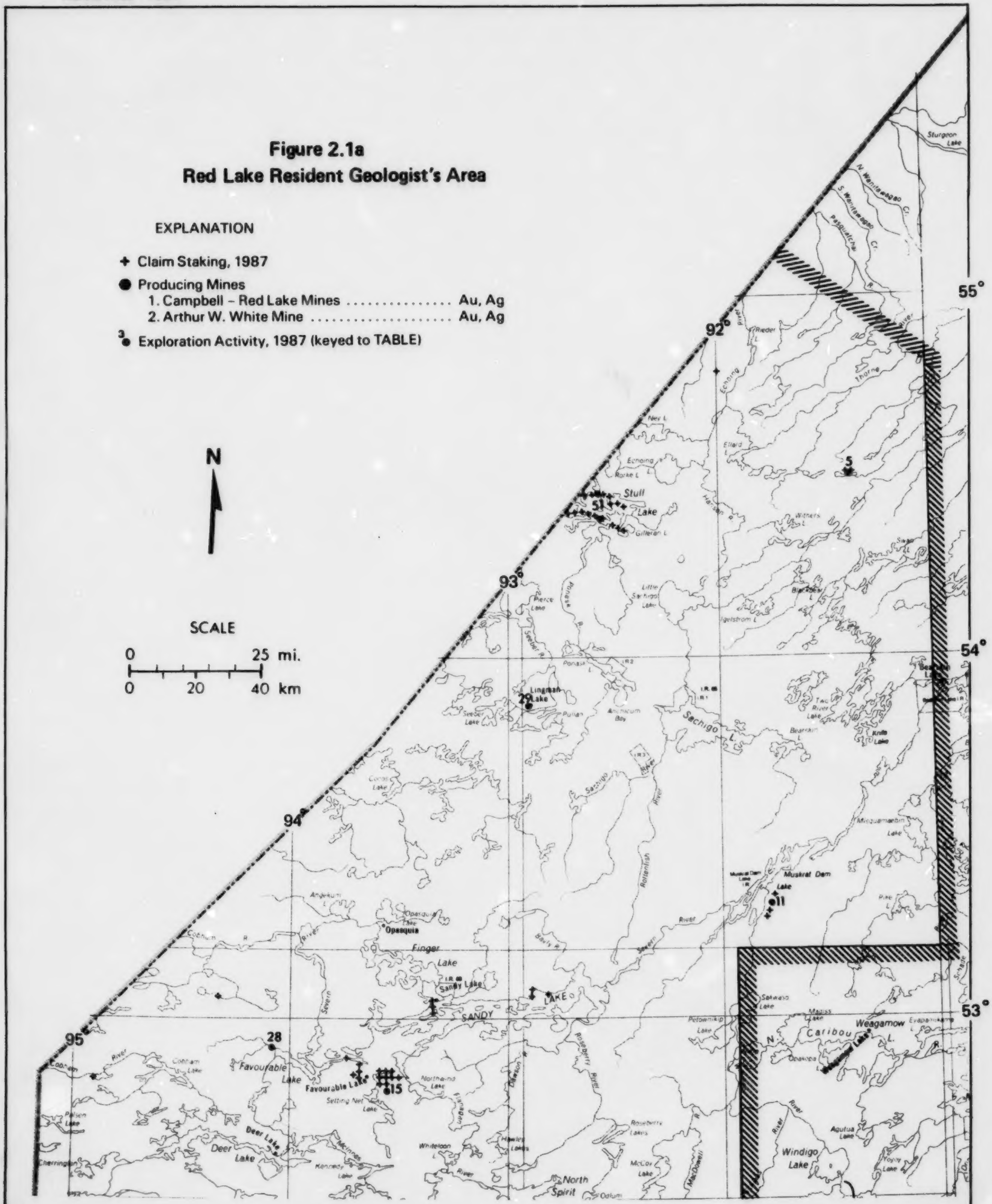


Figure 2.1a
Red Lake Resident Geologist's Area

EXPLANATION

- ✚ Claim Staking, 1987
- ● Producing Mines
  - 1. Campbell – Red Lake Mines .... Au, Ag
  - 2. Arthur W. White Mine .... Au, Ag
- ●³ Exploration Activity, 1987 (keyed to TABLE)

SCALE

0
25 mi.
0
20
40 km
N
55°
54°
53°
92°
93°
94°
95°
Sturgeon Lake
Echoing
Nev L
Echoing L
Rorke L
Stull Lake
Gilleran L
51
5
Ellard L
Withers L
Harlan R.
Pierce Lake
Little Sachigo Lake
Igelstrom L
Lingman Lake
29
Seeber Lake
Pullan
Angecum Bay
Sachigo L.
Sachigo
Bearskin
Knife Lake
Sachigo R.
Rottenfish River
Severn River
Muskrat Dam Lake
11
Pike L
Misquamaebin Lake
Angekum L
Opasquia Lake
Opasquia
Finger Lake
Sandy Lake
SANDY LAKE
Severn
28
Cobham Lake
Cobham River
Favourable Lake
15
Northwind Lake
Setting Net Lake
Deer Lake
Deer Lake
Kennedy Lake
Whiteloon Lake
Hewley Lakes
North Spirit
Odlum
McCoy Lake
Roseberry River
Roseberry Lakes
MacDowell R
Cherrington
Pelican Lake
Severn River
Sakwaso Lake
Petownikip Lake
N. Caribou L.
Weagamow L.
Opakopa
River
Windigo Lake
Agutua Lake
Trout Lake

Adjoins Figure 2.1b

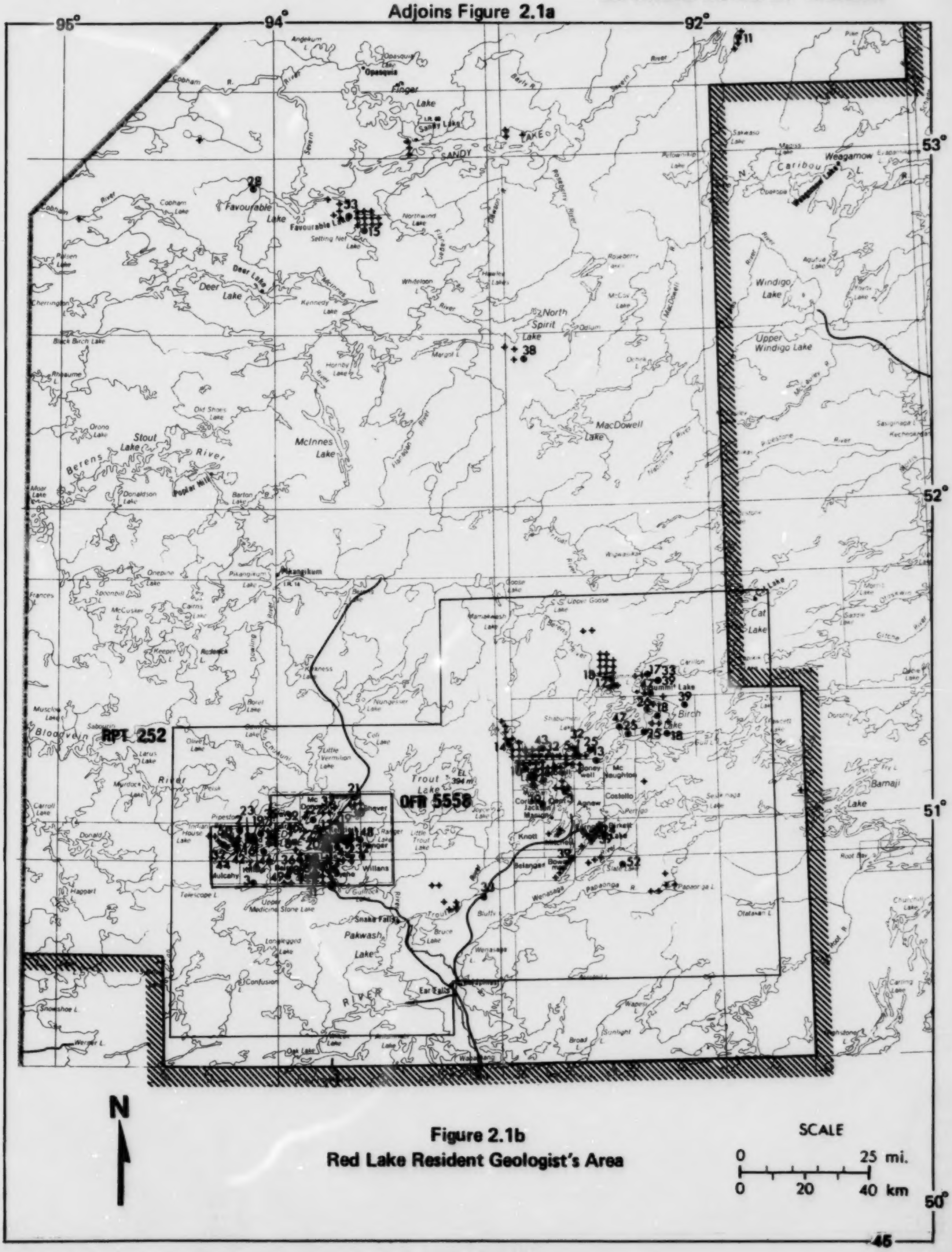

Adjoins Figure 2.1a
95°
94°
92°
53°
52°
51°
50°
Favourable Lake
Sandy Lake
Deer Lake
North Spirit Lake
Stout Lake
Berens River
McInnes Lake
MacDowell Lake
Windigo Lake
Upper Windigo Lake
Weagamow L.
Caribou L.
Pikangikum
Trout Lake
RPT 252
OFR 5558
Cat Lake
Birch Lake
Bamaji Lake
Pakwash Lake
Ear Falls
Bloodvein River
Confusion
Snake Falls
Upper Medicine Stone Lake
Papaonga L.
Wenasaga
N
SCALE
0
25 mi.
0
20
40 km

Figure 2.1b
Red Lake Resident Geologist's Area

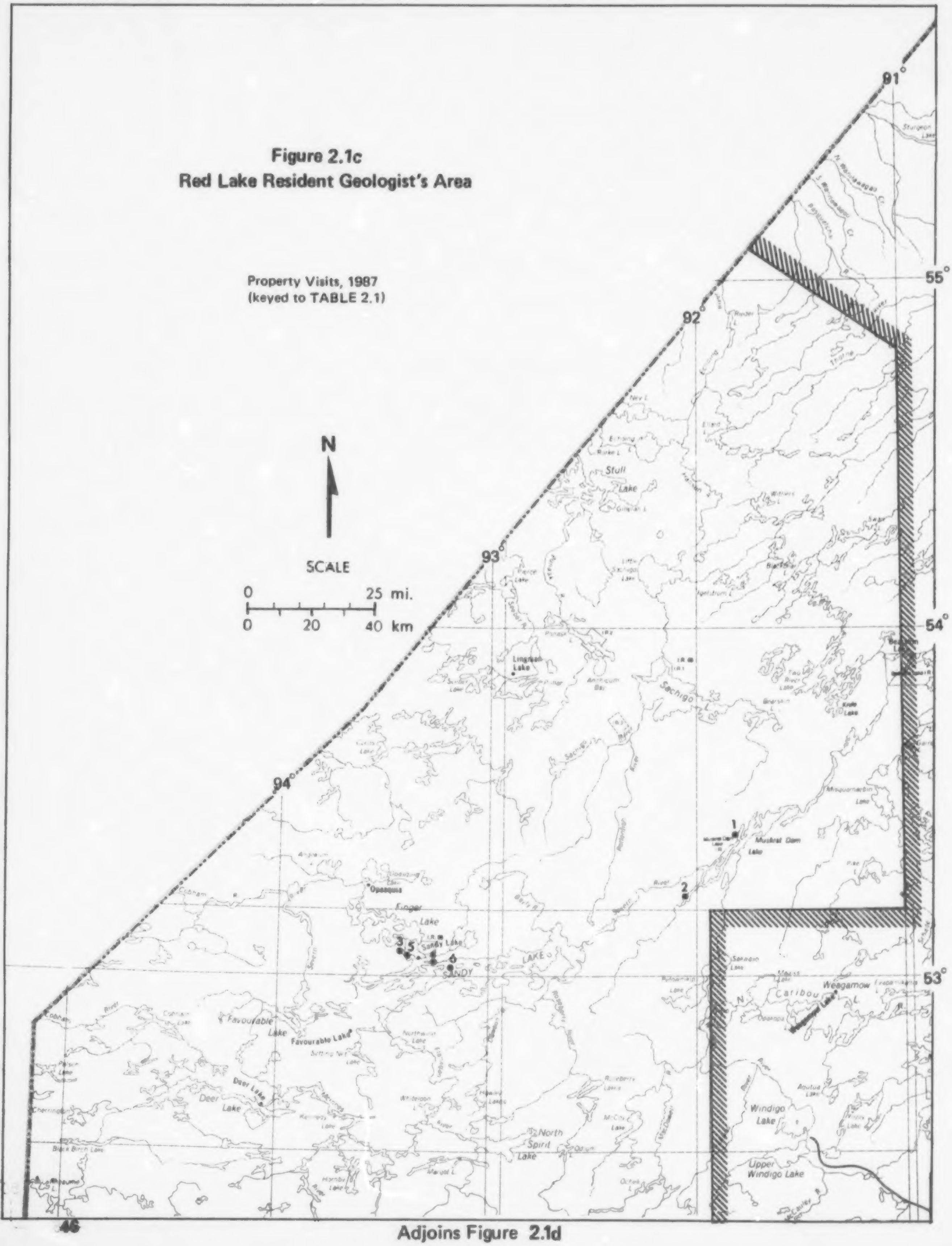


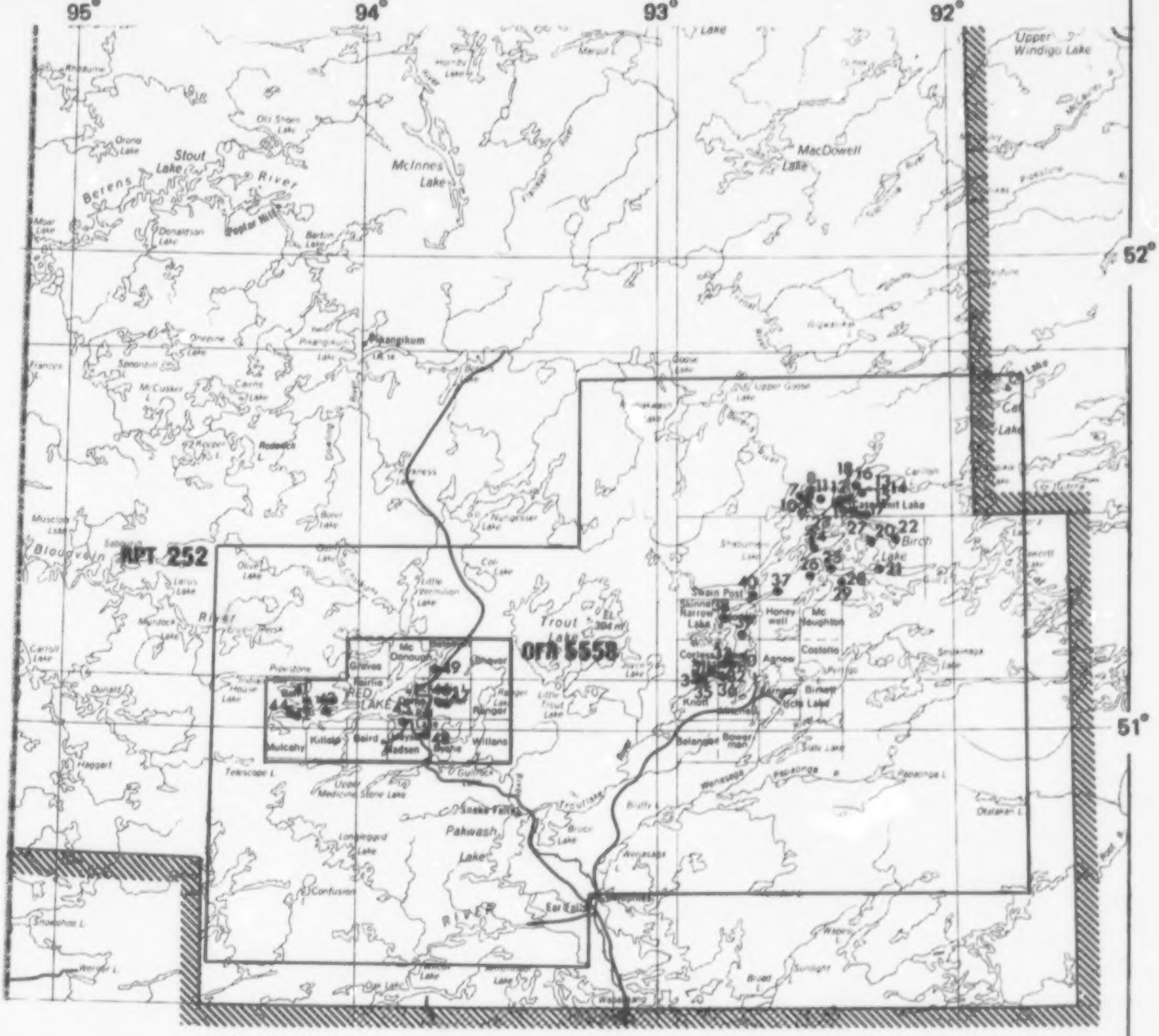
Figure 2.1c
Red Lake Resident Geologist's Area

Property Visits, 1987
(keyed to TABLE 2.1)

91°
92°
93°
94°
55°
54°
53°
N
SCALE
0 25 mi.
0 20 40 km
Stull Lake
Lingman Lake
Sachigo L.
Muskrat Dam Lake
1
2
3
4
5
6
Opasquia
Finger Lake
Sandy Lake
SANDY LAKE
Favourable Lake
Deer Lake
North Spirit Lake
Caribou L.
Weagamow L.
Windigo Lake
Upper Windigo Lake

Adjoins Figure 2.1d

Adjoins Figure 2.1c


95°
94°
93°
92°
52°
51°
Upper Windigo Lake
Berens River
Stout Lake
Poplar Hill
McInnes Lake
MacDowell Lake
Pikangikum
Bloodvein River
RPT 252
OFR 5558
Trout Lake
Red Lake
Graves
McDonough
Fairlie
Baird
Killala
Mulcahy
Dome
Heyson
Ranger
Willans
Madsen
Swain Post
Skinner
Narrow Lake
Honeywell
McNaughton
Costello
Agnew
Birch Lake
Bateman
Bowerman
Pakwash Lake
Ear Falls

N

Figure 2.1d
Red Lake Resident Geologist's Area

SCALE
0 25 mi.
0 20 40 km

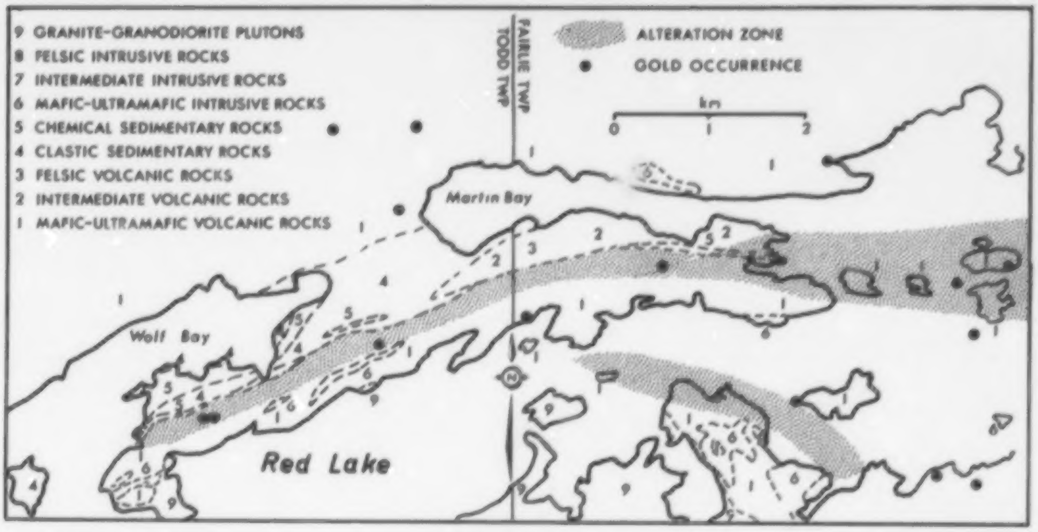

9 GRANITE-GRANODIORITE PLUTONS
8 FELSIC INTRUSIVE ROCKS
7 INTERMEDIATE INTRUSIVE ROCKS
6 MAFIC-ULTRAMAFIC INTRUSIVE ROCKS
5 CHEMICAL SEDIMENTARY ROCKS
4 CLASTIC SEDIMENTARY ROCKS
3 FELSIC VOLCANIC ROCKS
2 INTERMEDIATE VOLCANIC ROCKS
1 MAFIC-ULTRAMAFIC VOLCANIC ROCKS
FAIRLIE TWP
TODD TWP
ALTERATION ZONE
GOLD OCCURRENCE
km
0
1
2
Martin Bay
Wolf Bay
Red Lake

Figure 2.3. Geology, Gold occurrences and alteration zones in the Martin Bay-Wolfe Bay area of Red Lake.

with the erection of a new grinding plant, introduction of carbon-in-pulp technology, automated roaster control, and a new hydraulic backfill plant at an expenditure of $12.6 million. They also introduced Central Control technology. Other improvements consisted of the conversion of their conventional hoist to semi-automatic, and the purchase of electric-hydraulic drill jumbos and various sizes of electric load-haul-dump units at a total cost of $4.3 million. Ore reserves (proven, probable) are being maintained at 7.5 million tons grading 0.61 ounce gold per ton. Campbell Red Lake Mines Limited merged with Dome Mines Limited and Placer Development Limited in August.

Production at the A.W. White Mine is expected to be approximately 64 000 ounces of gold. This figure includes 4000 ounces which is contained in concentrates. This gold was recovered from 245 000 tons. Production in 1987 fell short of expectations due to a three week labour strike and associated work slow downs. The mill is currently processing 760 tons per day. Ore reserves, as of February 1987, are 1 540 178 tons grading 0.33 ounce gold per ton (proven), and total reserves (proven, possible) are 3 953 102 tons grading 0.31 ounce gold per ton.

EXPLORATION ACTIVITY

Table 2.3 is a list of exploration activities in the Red Lake Resident Geologist's area during the year. Most of this activity is located in the Red Lake and Birch-Confederation Lakes Greenstone Belts. Of the few exploration projects not found in these belts, two are exploring significant amounts of gold mineralization. One is the exploration of the Berens River Mine site by Zahavy Mines Limited, near Setting Net Lake (Favourable Lake), and the other is the exploration of the Twin Gold Mines Ltd. property by Massive Resources Limited and Agassiz Resources Ltd. near Lingman Lake, both to be discussed in the ensuing section. Other projects which are pursuing significant amounts of gold mineralization are McFinley Red Lake Mines Ltd. in Bateman Township, Golden Terrace Resources Corporation on Richardson Lake, and St. Joe Canada Inc. on Horseshoe Island, Birch Lake.

ZAHAVY MINES LIMITED, BERENS RIVER MINE SITE

Zahavy Mines Limited has undertaken an underground project at their Berens River Mine site. In 1987, they expended nearly $3.0 million on rehabilitating the mine site and carrying out both surface (10 000 m) and underground (8614 m) diamond drilling. Lateral underground development at the No. 2 shaft amounted to 306 m. Late in the year, the No. 1 shaft was being rehabilitated and a headframe being installed in preparation for further underground exploration. Surface drilling tested the No. 2 zone and No. 4 zone, while underground exploration at the No. 2 shaft tested the No. 3 zone. By mid November, Noramco Mining Corporation acquired a controlling interest in Zahavy Mines Limited.

Mineral exploration in the Favourable Lake area began in 1926, following a report on reconnaissance mapping by G.V. Douglas (1926) for the Ontario Department of Mines. Nine claims covering the mine site were staked by K.G. Murray. These claims were explored by various interests until 1936 when the property was acquired by Newmont Mining Corporation and a subsidiary, Berens River Mines Limited. Mine construction began in 1936 and by 1948, the No. I shaft was sunk to explore the No. I zone to 623 m with 13 levels. From the 558 m level, 361 m east of the shaft, a vertical winze was sunk to a depth of l071 m with eight levels. Other developments at the mine consisted of 5140 m of crosscuts, 7066 m of drifts, and 3252 m of raises. From 1939 to 1948, 560 607 tons of ore were processed, and 157 341 ounces of gold, 5 676 486 ounces of silver, 5 105 872 pounds of lead, and l 799 091 pounds of zinc were produced. The average grade of the ore milled was 0.28 ounce gold per ton and 10.34 ounces silver per ton.

In the 1940s, the No. 3 zone was explored when the No. 2 shaft was sunk to a depth of 156 m with

TABLE 2.2. RED LAKE GOLD PRODUCTION, APRIL 2, 1930 TO DECEMBER 31, 1986

Mine	Years of Production	Ore Milled (short tons)	Gold Produced (troy ounces)	(ounces per ton)
Howey	1930 - 1941; 1957(1)	4 630 779(4)	421 593(1)	0.091(4)
McKenzie Red Lake	1935 - 1966	2 353 833	651 156	0.277
Red Summit	1935 - 1936	591	277	0.469
Red Lake Gold Shore	1936 - 1938	86 333	21 100	0.244
Gold Eagle	1937 - 1941	180 095	40 204	0.223
Madsen	1938 - 1976	8 371 631	2 416 609	0.289
Hasaga	1938 - 1952	1 515 282	218 213	0.144
Cochenour - Willans(2)	1939 - 1971	2 311 165	1 244 279	0.538
McMarmac	1940 - 1948	152 978	45 246	0.296
A. W. White (Dickenson)(3)	1948 - Present	5 651 163	2 494 491	0.448
Starratt Olsen	1948 - 1956	907 813	163 990	0.181
Campbell Red Lake	1949 - Present	10 391 564	6 212 211	0.598
H. G. Young	1960 - 1963	288 179	55 244	0.192
Mount Jamie	1976	552	265	0.480
Buffalo	1981 - 1982	26 000	2002	0.077
Abino	1985 - 1986	2 733	1397	0.51
Lake Rowan	1986	3 916	276	0.07(5)
TOTAL		36 874 607	13 988 553	

Notes:

(1) Continuous production 1930 to 1941; includes 268 ounces recovered from "clean up" in 1957.

(2) Includes production from Annco and Wilmar properties.

(3) From 1970, includes production from Robin Red Lake.

(4) From 1930 to 1941, the ore mined at Howey, before sorting, totalled 5 158 376 tons. The average production from run-of-mine ore was therefore 0.0817 oz. gold per ton.

(5) Grade diluted due to waste rock.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2.3

Number on Figure	Individual or Company	Activity
1	AUPAN RED LAKE RESOURCES LTD.	DIAMOND DRILLING: DOME TWP.
2	BIRON BAY RESOURCES LTD.	DIAMOND DRILLING (7)-1018.6 m: BALL TWP. AND TODD TWP.
3	BLACK CLIFF MINES LTD./ TASU RESOURCES LTD.	GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS: HUDSON PATRICIA PROPERTY, GOODALL TWP. AND LAIRD LAKE PROPERTY, KILLALA TWP.
4	CAMPBELL RED LAKE MINES LTD.	DIAMOND DRILLING (8)-3176.6 m: BALMER TWP.
5	CANADIAN NICKEL COMPANY LTD.	GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (5)-755.91 m: SHABUMENI LAKE MAP SHEET
		GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS: SACHIGO RIVER MINE PROPERTY, ALJO LAKE MAP SHEET
		EVALUATION OF COCHENOUR WILLANS MINE: DOME TWP.
6	CANADIAN PATRICIA EXPLORATION LTD.	GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; TRENCHING AND STRIPPING: SKINNER TWP.
7	CHARLARMAR RESOURCES INC.	MECHANICAL STRIPPING: HEYSON TWP.
8	CHEVRON CANADA RESOURCES LTD.	GEOCHEMICAL SURVEY AND DIAMOND DRILLING (4)-947.6 m: FAIRLIE TWP.
		GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING 350 HRS.; DIAMOND DRILLING (3)-800 m: MY-RITT AND SKOOKUM BAY PROPERTIES, DOME TWP. AND HEYSON TWP.
9	DOLLARD MINES LTD.	GEOLOGICAL SURVEY: EARNGEY TWP.
10	EASTMONT GOLD MINES LTD.	GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING; DIAMOND DRILLING (25)-1524 m: BATHURST MINE PROPERTY, SKINNER TWP.
11	ELDOR RESOURCES LTD.	GEOLOGICAL SURVEY: KIPPEN LAKE MAP SHEET
12	ESSO RESOURCES CANADA LTD.	DIAMOND DRILLING: DOME TWP.
		GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING: CASUMMIT LAKE MAP SHEET
13	FALCONBRIDGE LTD.	GROUND GEOPHYSICAL SURVEY; DIAMOND DRILLING (2)-283 m: SHABUMENI LAKE MAP SHEET AND HONEYWELL TWP.
14	FLINT ROCK MINES LTD.	GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (6)-731.5 m: SHABU LAKE MAP SHEET
15	GEOTEST CORP.	GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS: SETTING NET LAKE MAP SHEET
16	GIBSON, ROBERT	DIAMOND DRILLING (11)-385 m: TODD TWP.
17	GOLDEN TERRACE RESOURCES CORP.	DIAMOND DRILLING (59)-5181.6 m: KOSTYNUK PROPERTY, CASUMMIT LAKE AND BROWNSTONE LAKE MAP SHEETS (SEE TEXT FOR MORE DETAILS)
18	GOLD FIELDS CANADIAN MINING LTD.	GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING; DIAMOND DRILLING: CASUMMIT LAKE, SATTERLY LAKE, KEIGAT LAKE, SEAGRAVE LAKE MAP SHEETS
19	GOLDQUEST EXPLORATION INC.	442.5 HRS. OF MECHANICAL STRIPPING ON REDCON, ABINO, INORE AND FORSYTH PROPERTIES; I.P. SURVEY ON ABINO AND REDCON PROPERTIES; GEOLOGICAL SURVEYS ON REDCON, ABINO AND INORE PROPERTIES; DIAMOND DRILLING AS FOLLOWS: PROPERTY — TWP. — NO. OF HOLES — TOTAL DRILLED ABINO — DOME/BALMER — 16 — 3,534.5 m INORE — BATEMAN/MCDONOUGH — 5 — 501.4 m REDCON — BALMER — 21 — 3,938.3 m ROWAN — TODD — 8 — 1,822.1 m 50 — 9,906 m
20	GUNNAR GOLD INC.	GROUND GEOPHYSICAL SURVEY; DIAMOND DRILLING 500 m: HEADWAY PROPERTY, DOME TWP.
21	HERBERT, LARRY	MECHANICAL STRIPPING: BATEMAN TWP.
22	INTERQUEST RESOURCES CORP./ RED LAKE SUN VALLEY RESOURCES CORP.	GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (15)-3878.6 m: FOLLANSBEE PROPERTY, DOME TWP.
23	JAMIE FRONTIER RESOURCES INC.	SURFACE DIAMOND DRILLING (2)-200 m; UNDERGROUND EXPLORATION - LATERAL DEVELOPMENT 137 m, BULK SAMPLE EXTRACTED 1000 TONS, WASTE ROCK EXTRACTED 2000 TONS; CONSTRUCTION OF MILL BUILDING AND ASSAY OFFICE BUILDING: TODD TWP.
24	LAC MINERALS LTD.	GEOCHEMICAL SURVEY; DIAMOND DRILLING (9)-2895.6 m: UCHI MINE PROPERTY, EARNGEY TWP.
25	LENCOURT LTD.	GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING: SHABUMENI LAKE AND SATTERLY LAKE MAP SHEETS
26	LIEDTKE, G. A.	MAGNETOMETER SURVEY: CASUMMIT LAKE MAP SHEET
27	LUXOR EXPLORATION INC.	GEOLOGICAL SURVEY; MECHANICAL STRIPPING: MCDONOUGH TWP.
28	MASSIVE RESOURCES LTD.	DIAMOND DRILLING (3)-643.4 m: BORLAND LAKE MAP SHEET

TABLE 2.3 Continued

<table>
<tr><th>Number on Figure</th><th>Individual or Company</th><th>Activity</th></tr>
<tr><td>29</td><td>MASSIVE RESOURCES LTD./
AGASSIZ RESOURCES LTD.</td><td>GEOLOGICAL, GEOPHYSICAL SURVEYS; TRENCHING; DIAMOND DRILLING (82)-13740 m: TWIN GOLD MINE PROPERTY AND ADJACENT ROMAN PROPERTY, LINGMAN LAKE MAP SHEET (SEE TEXT FOR MORE DETAILS)</td></tr>
<tr><td>30</td><td>MCFINLEY RED LAKE MINES LTD.</td><td>UNDERGROUND EXPLORATION CONSISTING OF DRIFTING, RAISING AND DIAMOND DRILLING; BULK SAMPLING; MILL CONSTRUCTION; SURFACE DIAMOND DRILLING (75)-12801 m: BATEMAN TWP. (SEE TEXT FOR MORE DETAILS)</td></tr>
<tr><td>31</td><td>MCNERNEY, W.</td><td>TRENCHING: HEYSON TWP.</td></tr>
<tr><td>32</td><td>NORAMCO EXPLORATION INC.</td><td>GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING ON 10 PROPERTIES; DIAMOND DRILLING AS FOLLOWS:
<table>
<tr><th>PROPERTY</th><th>LOCATION</th><th>NO. OF HOLES</th><th>TOTAL DRILLED</th></tr>
<tr><td>HOYLES BAY</td><td>BATEMAN TWP.</td><td>19</td><td>4,360 m</td></tr>
<tr><td>MCDONOUGH</td><td>MCDONOUGH TWP.</td><td>13</td><td>2,106 m</td></tr>
<tr><td>MCKENZIE ISLAND</td><td>DOME TWP./FAIRLIE TWP.</td><td>13</td><td>2,093 m</td></tr>
<tr><td>GULLROCK</td><td>BALMER TWP./RANGER TWP.
BYSHE TWP./WILLANS TWP.</td><td>27</td><td>5,924 m</td></tr>
<tr><td>MOSIER</td><td>SKINNER TWP./GOODALL TWP.</td><td>3</td><td>526 m</td></tr>
<tr><td>SHABUMENI</td><td>GOODALL TWP./SHABUMENI LAKE</td><td>7</td><td>1,693 m</td></tr>
<tr><td>SWAIN</td><td>GOODALL TWP.</td><td>4</td><td>715 m</td></tr>
<tr><td>HAMMELL</td><td>BALL TWP./TODD TWP./FAIRLIE TWP.</td><td>21</td><td>4,798 m</td></tr>
</table></td></tr>
<tr><td>33</td><td>NORANDA EXPLORATION COMPANY LTD.</td><td>GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS: MORAN PROPERTY, CASUMMIT LAKE MAP SHEET/DIAMOND DRILLING (5)-1582 m: GERRY LAKE MAP SHEET</td></tr>
<tr><td>34</td><td>NORANDA EXPLORATION COMPANY LTD./
TYLOX RESOURCES CORP.</td><td>GEOPHYSICAL SURVEY; TRENCHING; DIAMOND DRILLING (14)-2595 m: NEWMAN PROPERTY, TODD TWP.</td></tr>
<tr><td>35</td><td>OROFINO RESOURCES LTD.</td><td>GROUND GEOPHYSICAL SURVEY; DIAMOND DRILLING 1950.7 m: RED CREST PROPERTY, TODD TWP.</td></tr>
<tr><td>36</td><td>PARVUS MINES LTD.</td><td>GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING 194.5 HRS.; DIAMOND DRILLING (15)-4408 m: HEYSON TWP. AND BAIRD TWP.</td></tr>
<tr><td>37</td><td>PETERSON, C.</td><td>MECHANICAL STRIPPING: HEYSON TWP.</td></tr>
<tr><td>38</td><td>PETROMET RESOURCES LTD.</td><td>GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (3)-632.5 m: HEWITT LAKE MAP SHEET</td></tr>
<tr><td>39</td><td>PLACER DOME INC.</td><td>GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS: CORLESS TWP., BOWERMAN TWP. AND EARNGEY TWP.
DIAMOND DRILLING 4447.7 m: CASUMMIT LAKE AND KEIGAT LAKE MAP SHEETS
DIAMOND DRILLING 921.8 m: CORLESS TWP. AND DENT TWPS.</td></tr>
<tr><td>40</td><td>RED LAKE BUFFALO RESOURCES LTD.</td><td>GEOLOGICAL SURVEY: HEYSON TWP.</td></tr>
<tr><td>41</td><td>RED LAKE SUN VALLEY RESOURCES CORP.</td><td>GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (14)-3500 m: LENNIE PROPERTY, BALMER TWP.</td></tr>
<tr><td>42</td><td>RIVARD, O'BRIEN</td><td>DIAMOND DRILLING: TODD TWP.
AIRBORNE GEOPHYSICAL SURVEY: BATEMAN TWP.</td></tr>
<tr><td>43</td><td>SHABU GOLD MINES LTD.</td><td>DIAMOND DRILLING (23)-3181.7 m: SHABU LAKE MAP SHEET</td></tr>
<tr><td>44</td><td>SHANE RESOURCES LTD.</td><td>GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (14)-1227 m: WEST RED LAKE PROPERTY, BALL TWP.</td></tr>
<tr><td>45</td><td>SHERRITT GORDON MINES LTD.</td><td>GEOLOGICAL SURVEY; DIAMOND DRILLING (6)-973 m: FAIRLIE TWP. AND DOME TWP.</td></tr>
<tr><td>46</td><td>SOLTERMANN, R.</td><td>MECHANICAL STRIPPING: TODD TWP.</td></tr>
<tr><td>47</td><td>ST. JOE CANADA INC./
NEXUS RESOURCES CORP.</td><td>GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (75)-11599 m: SHABUMENI LAKE, SATTERLY LAKE, CASUMMIT LAKE AND KEIGAT LAKE MAP SHEETS</td></tr>
<tr><td>48</td><td>TENAJON SILVER CORP.</td><td>DIAMOND DRILLING (2)-492 m: BALMER TWP.</td></tr>
<tr><td>49</td><td>UNITED REEF PETROLEUMS LTD./
CANHORN MINING CORP.</td><td>GEOLOGICAL, GROUND GEOPHYSICAL SURVEYS; DIAMOND DRILLING (12)-1878.8 m: AIKEN RUSSET PROPERTY, BAIRD TWP.</td></tr>
<tr><td>50</td><td>WESTERN CANADIAN MINING CORP./
VENTUREX INTERNATIONAL MINING CORP.</td><td>GEOLOGICAL, GEOCHEMICAL, GROUND GEOPHYSICAL SURVEYS; MECHANICAL STRIPPING; DIAMOND DRILLING (2)-299.3 m: BALL TWP. AND TODD TWP.</td></tr>
<tr><td>51</td><td>WESTMIN RESOURCES LTD./
TANQUERAY RESOURCES LTD.</td><td>AIRBORNE GEOPHYSICAL SURVEY: STULL LAKE, RAPSON BAY, GILLERAN LAKE, RICHARDSON ARM MAP SHEETS</td></tr>
<tr><td>52</td><td>WILLIAMSON, J. M.</td><td>GROUND GEOPHYSICAL SURVEYS: AVIS LAKE MAP SHEET</td></tr>
<tr><td>53</td><td>ZAHAVY MINES LTD.</td><td>SURFACE DIAMOND DRILLING 10,000m, 8614 m (UNDERGROUND); DRIFTING 306 m, BULK SAMPLING: SETTING NET LAKE MAP SHEET</td></tr>
</table>

TABLE 2.4 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM	AIRBORNE ELECTROMAGNETIC SURVEY	MAG	MAGNETOMETER SURVEY
AG	SILVER	MANUAL	MANUAL WORK
AMAG	AIRBORNE MAGNETOMETER SURVEY	OMEP	ONTARIO MINERAL EXPLORATION PROGRAM
ASSESS	ASSESSMENT	OVD	OVERBURDEN DRILLING
AU	GOLD	PEM	PULSE ELECTROMAGNETIC SURVEY
DDH	DIAMOND DRILL HOLE (NO) FOOTAGE	PROS	PROSPECTUS
EM	ELECTROMAGNETIC SURVEY	rTr	BEDROCK TRENCHING
GOECHEM	GEOCHEMICAL SURVEY	SA	SAMPLING
GL	GEOLOGICAL SURVEY	SGL	SURFICIAL GEOLOGY
HLEM	HORIZONTAL LOOP ELECTROMAGNETIC SURVEY	Str	STRIPPING
IP	INDUCED POLARIZATION SURVEY	VLF-EM	VERY LOW FREQUENCY EM SURVEY
L-GEOCHEM	LITHOGEOCHEMICAL SURVEY	UG	UNDERGROUND EXPLORATION

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
AVIS LAKE	52K/10	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	MAG, HLEM, GL, SA	1986	2.9648	81-86
AVIS LAKE	52K/10	WILLIAMSON, J. M.	AU	ASSESS	MAG, VLF-EM	1987	2.10637	77-87
BAIRD TWP.	52K/13	CANHORN MINING CORP.	AU	ASSESS	DDH(6)-2,367'	1987	—	68-87
BAIRD TWP.	52K/13	REDAURUM RED LAKE MINES LTD.	AU	OMEP	MAG, VLF-EM, GL	1984	63.4523	OM84-1 -C-191
BALL TWP. HAMMELL LAKE	52M/1 52M/1	SHANE RESOURCES LTD.	AU	ASSESS	MAG, VLF-EM	1987	2.10175	61-87
BALL TWP.	52M/1	SHANE RESOURCES LTD.	AU	ASSESS	SA	1987	2.10673	79-87
BALMER TWP.	52N/4	DUNLOP, B.	AU	ASSESS	HLEM	1985	2.9834	13-87
BALMER TWP.	52N/4	DUNLOP, B.	AU	ASSESS	DDH(7)-1,566'	1985	—	16-87
BALMER TWP.	52N/4	TENAJON SILVER CORP.	AU	ASSESS	DDH(2)-1,614'	1987	—	98-87
BATEMAN TWP.	52N/4	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(4)-1,679'	1986	—	59-87
BATEMAN TWP. BLACKBEAR LAKE	52N/4 52N/4	HERBERT, L.	AU	ASSESS	Str	1987	—	83-87
BATEMAN TWP.	52N/4	MCFINLEY MINES LTD. SABINA INDUSTRIES LTD.	AU AG	OMEP	MAG, EM, GL, UG, SA	1982	63.3996	OM82-1 -JV-16
BATEMAN TWP.	52N/4	MCFINLEY MINES LTD.	AU AG	OMEP	UG, DDH(250)-23,300'	1985 1986	63.4659	OM85-1 -C-38
BATEMAN TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	AMAG, AEM	1986	2.9820	23-87
BATEMAN TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GL	1986	2.10351	86-87
BATEMAN TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GEOCHEM, SA	1986 1987	2.10562	99-87
BATEMAN TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	DDH(7)-4,792'	1987	—	90-87
BOWERMAN TWP.	52K/15	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1986	2.9712	6-87
BOWERMAN TWP.	52K/15	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-430'	1987	—	136-87
BYSHE TWP. WILLANS TWP. RANGER TWP. BALMER TWP.	52K/13 52K/13 52N/4 52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GL	1986	2.10372	85-87
BYSHE TWP. RANGER TWP. BALMER TWP. WILLANS TWP.	52K/13 52N/4 52N/4 52K/13	PURE GOLD RESOURCES INC.	AU	ASSESS	AMAG, AEM	1986	2.9816	19-87
CASUMMIT LAKE	52N/8	BP RESOURCES CANADA LTD.	AU	ASSESS	GEOCHEM	1986	2.10005	51-87
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(2)-964'	1987	—	35-87
CASUMMIT LAKE	52N/8	DURATION MINES LTD. WILSHIRE ENERGY RESOURCES INC.	AU	OMEP	MAG, VLF-EM, GL	1984	2.7498	OM84-1 -C-111
CASUMMIT LAKE	52N/8	ESSO RESOURCES CANADA LTD.	AU	ASSESS	MAG, GL, SA	1987	2.10451	76-87
CASUMMIT LAKE	52N/8	ESSO RESOURCES CANADA LTD.	AU	ASSESS	SA	1987	2.10419	80-87
CASUMMIT LAKE	52N/8	ESSO RESOURCES CANADA LTD.	AU	ASSESS	Str, rTr,	1987	—	81-87

TABLE 2.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
CASUMMIT LAKE	52N/8	GABBS RESOURCES LTD.	AU	ASSESS	Str, rTr	1986	--	99-86
CASUMMIT LAKE BROWNSTONE LAKE	52N/8 52N/9	GOLDEN TERRACE RESOURCES CORP.	AU	ASSESS	GL, GEOCHEM	1986	2.9812	98-86
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	AMAG, AEM, VLF-EM	1985	2.9643	78-86
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	DDH(1)-509'	1987	--	36-87
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	SA	1987	--	37-87
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	GEOCHEM	1987	2.9963	40-87
CASUMMIT LAKE	52N/8	INTERNATIONAL MAPLE LEAF RESOURCES LTD.	AU	ASSESS	MAG, VLF-EM	1987	2.9958	15-87
CASUMMIT LAKE	52N/8	LIEDTKE, G. A.	AU	ASSESS	MAG	1987	2.10433	71-87
CASUMMIT LAKE	52N/8	MARILYN RESOURCES INC.	AU	ASSESS	DDH(4)-1,246'	1987	--	73-87
CASUMMIT LAKE KEIGAT LAKE	52N/8 52N/8	ST. JOE CANADA INC.	AU	ASSESS	GL	1986	2.9576	86-86
CASUMMIT LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(2)-649'	1987	--	121-87
CORLESS TWP. DOME TWP.	52N/2 52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1987	2.10171	69-87
CORLESS TWP. DENT TWP.	52N/2 52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(7)-2,083'	1987	--	120-87
DENT TWP.	52N/2	OROFINO RESOURCES LTD.	AU	OMEP	DDH(9)-3,000', GL, rTr, SA	1984	63.4535	OM84-1-C-88
DENT TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	DDH(2)-1,274'	1987	--	78-87
DENT TWP. CORLESS TWP.	52N/2 52N/2	SHERRITT GORDON MINES LTD.	AU	OMEP	GL, L-GEOCHEM	1984	63.4550	OM84-1-C-48
DOME TWP.	52N/4	ESSO MINERALS CANADA	AU	OMEP	UG	1985	63.4637	OM84-1-C-41
DOME TWP.	52N/4	NORAMCO EXPLORATION INC.	AU	ASSESS	AMAG, AEM	1986	2.10130	60-87
DOME TWP.	52N/4	PETERSON, C. W.	AU	OMEP	Str, rTr, SA	1984	63.4529	OM83-1-I-374
DOME TWP.	52N/4	PETERSON, C. W.	AU	OMEP	Str, SA	1985	63.4624	OM85-1-I-6
DOME TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	AMAG, AEM	1986	2.9819	21-87
DOME TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GL	1986	2.10377	91-87
DOME TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	DDH(7)-1,095'	1987	--	89-87
DOME TWP.	52N/4	SHERRITT GORDON MINES LTD.	AU	ASSESS	DDH(4)-2,041', SA	1987	2.10029	52-87
EARNGEY TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	SA	1986	2.9634	96-86
EARNGEY TWP.	52N/2	TERRELL, M. J.	AU	ASSESS	SA	1986	2.9339	8-87
FAIRLIE TWP.	52N/4	CHEVRON MINERALS LTD.	AU	ASSESS	DDH(4)-3,109'	1987	--	17-87
FAIRLIE TWP. DOME TWP.	52N/4 52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	AMAG, AEM	1986	2.9817	22-87
FAIRLIE TWP.	52N/4	SHERRITT GORDON MINES LTD.	AU	ASSESS	DDH(1)-997'	1987	--	44-87
FAIRLIE TWP.	52N/4	ULTRA MINES & ENERGY CORP.	AU	ASSESS	MAG, VLF-EM, GL, GEOCHEM, SGL	1986	2.9933	10-87
FREDART LAKE	52K/15	NORANDA EXPLORATION COMPANY LTD.	AU BASEMETALS	ASSESS	DDH(1)-1,620'	1986	--	9-87
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	PEM	1985	2.9916	30-87
GERRY LAKE SOUTH OF OTTER LAKE	52K/14 52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	PEM	1986	2.9489	76-86
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	DDH(1)-390'	1986	--	31-87
GERRY LAKE	52K/14	NORANDA EXPLORATION COMPANY LTD.	AU BASEMETALS	ASSESS	DDH(1)-1,391'	1986	--	12-87

TABLE 2.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
GERRY LAKE FREDART LAKE	52K/14 52K/15	NORANDA EXPLORATION COMPANY LTD.	AU BASEMETALS	ASSESS	MAG, PEM	1986	2.9717	25-87
GOODALL TWP. SKINNER TWP. HONEYWELL TWP. SHABUMENI LAKE	52N/2 52N/2 52N/12 52N/7	NORAMCO EXPLORATION INC.	AU	ASSESS	AMAG, AEM	1987	2.10520	110-87
HAMMELL LAKE	52M/1	GIBSON, R.	AU	ASSESS	DDH(9)-1,043'	1987	--	95-87
HAMMELL LAKE	52M/1	GIBSON, R.	AU	ASSESS	DDH(1)-116'	1987	--	113-87
HAMMELL LAKE	52M/1	GIBSON, R.	AU	ASSESS	DDH(1)-104'	1987	--	117-87
HAMMELL LAKE	52M/1	HEATH GOLD MINES LTD.	AU	NON ASSESS	PROS	1944	--	--
HAMMELL LAKE	52M/1	JAMIE FRONTIER RESOURCES INC.	AU	OMEP	UG	1984	63.4522	OM84-1 -C-316
HAMMELL LAKE	52M/1	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	HLEM	1983	2.9739	94-86
HAMMELL LAKE	52M/1	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	DDH(1)-337'	1986	--	3-87
HAMMELL LAKE	52M/1	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	MAG, VLF-EM	1987	2.10027	49-87
HAMMELL LAKE	52M/1	SOLTERMANN, R. H.	AU	OMEP	GL, L-GEOCHEM	1984	63.4608	OM83-1 -I-384
HAMMELL LAKE	52M/1	SOLTERMANN, R. H.	AU	OMEP	GL, Str, rTr, SA	1985	63.4623	OM85-1 -I-62
HEWITT LAKE WAPISKOWAMIK LAKE ARMSTRONG LAKE	53C/7 53C/7 53C/7	NORANDA EXPLORATION COMPANY LTD.	AU BASEMETALS	NON ASSESS	MAG, EM, GL	1969	--	--
HEWITT LAKE WAPISKOWAMIK LAKE	53C/7 53C/7	PETROMET RESOURCES LTD.	AU	ASSESS	MAG, HLEM	1987	2.10168	62-87
HEWITT LAKE	53C/7	PETROMET RESOURCES LTD.	AU	ASSESS	DDH(1)-300'	1987	--	128-87
HEWITT LAKE	53C/7	PETROMET RESOURCES LTD.	AU	ASSESS	DDH(3)-1,119'	1987	--	131-87
HEYSON TWP.	52K/13	HERBERT, L.	AU	ASSESS	Str	1987	--	63-87
HEYSON TWP.	52K/13	MCNERNEY, W.	AU	ASSESS	rTr	1986	--	119-87
HEYSON TWP.	52K/13	PETERSON, C. W. SPINELLI, J.	AU	ASSESS	MANUAL	1985	--	92-87
HEYSON TWP.	52K/13	PETERSON, C. W. SPINELLI, J.	AU	ASSESS	Str, rTr	1986	--	45-87
HEYSON TWP.	52K/13	SPINELLI, J.	AU	OMEP	Str, SA	1984	63.4531	OM84-1 -I-104
HEYSON TWP.	52K/13	SPINELLI, J.	AU	OMEP	Str	1985	63.4627	OM85-1 -I-15
HONEYWELL TWP. MCNAUGHTON TWP. SHABUMENI LAKE	52N/12 52N/1 52N/7	PARFLOW MINES & ENERGY CORP.	AU	ASSESS	MAG, VLF-EM, GL, GEOCHEM	1986	2.9998	26-87
KARAS LAKE	52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	DDH(2)-1,328'	1985	--	5-87
KARAS LAKE	52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	DDH(2)-1,311'	1985	--	58-87
KARAS LAKE GERRY LAKE	52K/14 52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	NON ASSESS	PEM	1986	2.9488	--
KARAS LAKE GERRY LAKE	52K/14 52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	DDH(1)-430'	1986	--	32-87
KEIGAT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(3)-1,486'	1986	--	28-87
KEIGAT LAKE CASUMMIT LAKE	52N/8 52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(32)-13,869'	1986	--	38-87
KEIGAT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(16)-6,492'	1987	--	126-87
KEIGAT LAKE CASUMMIT LAKE	52N/8 52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	DDH(3)-2,409.4'	1987	--	39-87
KEIGAT LAKE CASUMMIT LAKE	52N/8 52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	AMAG, AEM	1987	2.10275	72-87

TABLE 2.4 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
MCDONOUGH TWP.	52N/4	LUXOR EXPLORATIONS INC.	AU	ASSESS	Str	1987	--	104-87
MCDONOUGH TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	AMAG, AEM	1986	2.9818	20-87
MCDONOUGH TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GEOCHEM	1986	2.10537	102-87
MCDONOUGH TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	DDH(9)-4,928'	1987	--	67-87
MCDONOUGH TWP.	52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GL	1987	2.10376	87-87
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	VLF-EM	1986	2.9598	91-86
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	DDH(5)-1,693'	1986	--	27-87
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	GEOCHEM	1986	2.9880	29-87
RANGER TWP. BYSHE TWP. WILLANS TWP. BALMER TWP.	52N/4 52K/13 52K/13 52N/4	PURE GOLD RESOURCES INC.	AU	ASSESS	GEOCHEM	1986	2.10479	103-87
SHABU LAKE	52N/7	SHABU GOLD MINES LTD.	AU	ASSESS	DDH(23)-10,438.7'	1987	--	93-87
SHABUMENI LAKE	52N/7	CANADIAN NICKEL COMPANY LTD.	AU	ASSESS	MAG, HLEM	1987	2.10122	42-87
SHABUMENI LAKE HONEYWELL TWP.	52N/7 52N/12	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1986	2.9567	85-86
SHABUMENI LAKE	52N/7	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-508'	1987	--	115-87
SHABUMENI LAKE	52N/7	FALCONBRIDGE LTD.	AU	ASSESS	MAG, VLF-EM	1986 1987	2.10238	54-87
SHABUMENI LAKE HONEYWELL TWP.	52N/7 52N/12	FALCONBRIDGE LTD.	AU	ASSESS	HLEM	1987	2.10237	55-87
SAHBUMENI LAKE	52N/7	FALCONBRIDGE LTD.	AU	ASSESS	MAG, VLF-EM, HLEM	1987	2.10226	56-87
SHABUMENI LAKE	52N/7	FALCONBRIDGE LTD.	AU	ASSESS	DDH(1)-420'	1987	--	82-87
SHABUMENI LAKE	52N/7	MARILYN RESOURCES LTD.	AU	ASSESS	MAG, VLF-EM	1987	2.10445	70-87
SHABUMENI LAKE SATTERLY LAKE	52N/7 52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(20)-5,280'	1987	--	75-87
SKINNER TWP.	52N/2	DURATION MINES LTD. WILSHIRE ENERGY RESOURCES INC.	AU	OMEP	MAG, VLF-EM, GL	1984	2.7498	OM84-1 -C-111
SKINNER TWP.	52N/2	EASTMONT GOLD MINES LTD.	AU	ASSESS	MAG, VLF-EM	1986 1987	2.9991	18-87
SKINNER TWP.	52N/2	WALDIE, S.	AU	ASSESS	MAG, VLF-EM	1987	2.10158	41-87
SLATE LAKE	52K/15	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	MAG, VLF-EM, GL, GEOCHEM	1986	2.10185	64-87
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	AU	ASSESS	DDH(1)-501'	1985	--	6-87
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	AU	ASSESS	DDH(3)-1,563'	1985	--	34-87
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	AU	ASSESS	DDH(1)-600'	1985	--	57-87
STULL LAKE RICHARDSON ARM LAKE RAPSON BAY GILLERAM LAKE	53K/7 53K/7 53K/8 53K/8	WESTMIN RESOURCES LTD.	AU	ASSESS	AMAG, AEM	1987	2.10278	74-87
UCHI LAKE & EARNGEY TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1987	2.10196	68-87
UCHI LAKE & EARNGEY TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	DDH(17)-5,385'	1986	--	97-86

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 2.5

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1987	4, 512	1, 708	11, 017	81, 854	138, 443	23, 440	261, 741
1986	3, 803	1, 598	10, 427	48, 325	127, 445	6, 360	189, 633
1985	2, 673	2, 260	8, 212	42, 000	201, 052	16, 642	269, 262
1984	4, 344	1, 725	7, 799	32, 588	78, 538	12, 495	128, 664
1983	2, 407	1, 204	5, 180	18, 637	22, 035	3, 468	53, 207
1982	942	1, 884	3, 992	23, 967	79, 662	6, 787	118, 775
1981	1, 719	1, 249	4, 889	28, 771	66, 000	8, 182	107, 430
1980	2, 220	1, 115	4, 301	38, 482	30, 240	871	71, 975
1979	1, 068	1, 763	3, 221	21, 108	38, 380	3, 154	62, 949
1978	1, 207	1, 521	3, 916	25, 574	19, 496	2, 480	50, 997
1977	2, 324	2, 395	4, 261	12, 994	45, 080	620	59, 196
1976	2, 705	1, 382	4, 332	18, 680	23, 578	380	46, 544
1975	1, 368	2, 059	2, 957	29, 377	12, 714	960	44, 717
1974	1, 339	1, 829	3, 648	47, 362	5, 660	3, 040	57, 719
1973	1, 616	3, 157	4, 009	60, 027	20, 474	NIL	83, 019
1972	2, 219	5, 284	5, 588	34, 261	14, 858	5, 216	56, 173
1971	1, 541	4, 922	8, 486	73, 019	50, 920	2, 243	127, 556
1970	3, 971	7, 194	11, 759	73, 886	329, 065	17, 606	427, 527
1969	10, 999	933	14, 772	49, 212	66, 032	1, 320	119, 039
1968	2, 451	1, 702	4, 784	15, 367	48, 800	1, 228	65, 395

levels established at 58, 104, and 150 m. Only minor amounts of lateral workings were completed and little record of ore production exists.

In 1955 Berens River Mines Limited was dissolved and in 1959, the claims reverted to the Crown. Golsil Mines Limited was incorporated in the same year and acquired the property. In 1966, they deepened the No. 2 shaft to 230 m, carried out 300 m of drifting on the 150 m level, and established new levels at 188 and 225 m. A total of 113 m of crosscutting and drifting was carried out on the 225 m level. In 1967, 152 m of drifting and 48 m of crosscutting was performed. In 1971, Golsil Mines Limited changed its name to Zahavy Mines Limited.

East-West Resources Ltd. optioned the property in 1974 and carried out an underground exploration program which consisted of sampling and diamond drilling.

In 1981, a joint venture with Getty Mines Limited gave Getty a 50 percent interest in the property. In 1982, 437 m of drifts and 15 m of raises were completed. This program delineated 601 500 tons grading 0.19 ounce gold per ton and 4.4 ounces silver per ton of mineable reserves within the No. 3 zone to a depth of 600 m. In 1987, Zahavy Mines Limited acquired Getty Mines Limited's interest in the property.

Gold mineralization, which occurs as base metal rich, quartz-actinolite veins, is hosted by a north-trending lens of felsic to intermediate volcanic rocks which is 4.5 km by 2 to 3 km. This lens is surrounded by mafic volcanic and sedimentary rock in which stratigraphy is north-striking and west-facing. East-southeast-trending veins seem to be particularly well developed and common within this lens which is host to 20 veins. Most of these veins are localized along faults trending east-southeast. Wallrock in the vicinity of the veins has been sericitized, giving the appearance of being silicified. A broad halo of pyrite (up to 15 m) also surrounds the veins. The area has undergone amphibolite grade metamorphism, indicated by the presence of hornblende in the less altered country rock and by garnets in the altered zones near the veins.

The No. 1 vein consists of narrow, parallel, or *en echelon* siliceous zones of tabular to lenticular form. It is often difficult to distinguish between silicified wallrock and fissure filling; the mineralization often appears to be related to silicification. The No. 1 vein can be traced for 450 m. Ore shoots within the zones are from 20 to 100 m long and 1 to 8 m wide. The No. 3 zone is 366 m in length and is similar to the No. I zone. Paragenetic studies by Oliver (1949) describe an early introduction of quartz and actinolite followed by pyrite-pyrrhotite, galena, sphalerite, tetrahedrite, chalcopyrite, gold, silver (native dyscrasite and ruby silver), and calcite.

MASSIVE RESOURCES LIMITED

Massive Resources Limited is financing a 20 000 m drill program on Twin Gold Mines Ltd.'s Lingman Lake Property. Agassiz Resources Ltd., which has a 54 percent interest in Twin Gold Mines Ltd., is the operator. Prior to this drilling program, James Wade Engineering Limited was engaged to reassess the property. As a result of this reassessment, the reserves (all categories) stand at 1 470 241 tons grading 0.26 ounce gold per ton, the proven and probable reserves at 798 032 tons grading 0.26 ounce gold per ton. The objective of this program was to double the reserves, enabling a decision to proceed with underground exploration. At year-end, the situation was optimistic.

The discovery of this gold mineralization was made in 1937, and on March 23, 1938, the property was staked by Glen Rhapson. On January 17, 1939, the claims were transferred to John Drybrough who let the claims lapse. During the summer of 1938, the main occurrences were trenched and several veins were discovered. A map, dated 1938, was acquired by R. Thompson of the Ontario Department of Mines in 1945, showing the location of trenches and diamond drilling. On October 24, 1944, Art Van der Brink restaked the property which was subsequently transferred to Lingman Lake Mines Limited on January 24, 1945. The company also acquired claims from E.G.H. Schultz, L. Paget, and J. Kersopp and late in 1945, changed its name to Lingman Lake Gold Mines Limited. In 1945 and 1946, 79 holes were drilled and shaft sinking began. By 1948, the shaft had been sunk to 126 m and levels were established at 46, 84, and 122 m levels. A total of 1383 m of drifting, crosscutting, and raising was completed. At this time, reserves were 148 000 tons grading 0.48 ounce gold per ton. In 1948, the company again changed its name to become Lake Lingman Gold Mining Company Limited and in 1972 and 1973, the name changed to Lakelyn Mines Limited. A diamond drilling program and a feasibility study was carried out. In 1978, drill-indicated reserves above the 122 m level stood at 440 000 tons grading 0.41 ounce gold per ton on the North and South Zones and 130 000 tons grading 0.21 ounce gold per ton on the West Zone. A further 500 000 tons has been inferred below the 400-foot level.

The gold-bearing mineralized zones of the Twin Gold Mines Ltd. Property are underlain by east-trending mafic volcanic rocks with minor interflow sediments within 200 m south of the northern margin of the greenstone belt. The mafic volcanic rocks are crosscut by narrow dikes of granite, granodiorite, feldspar, and quartz-felsdspar porphyry, especially in the vicinity of the gold mineralization (Wilson 1983). This sequence is crosscut by a north-trending diabase dike. The gold mineralization consists of three east-trending shear zones which have been silicified, carbonated, and contain 2 percent disseminated sulphides, mainly pyrite with minor arsenopyrite, chalcopyrite, and pyrrhotite. The ore is associated with zones of silicification, especially where needles of arsenopyrite are present. The "Hanging-Wall Zone" is 488 m in length with an average width of 1.34 m and a drill-indicated grade of 0.19 ounce gold per ton (uncut). The "South Zone", roughly 60 m to the north, is also 488 m in length, has an average width of 1.8 m and an average grade of 0.30 ounce gold per ton (uncut). The "North Zone" is 122 m north of the "South Zone" at its west end; however, it merges with the "South Zone" at the east end, and has a length of 427 m. This zone has an average width of 1.77 m and an average grade of 0.63 ounce gold per ton (uncut). The North and South Zones are terminated to the west by the diabase dike. West of the diabase is the "West Zone", a possible extension of the "North Zone". It has a length of 183 m, a width of 1.64 m, and an average grade of 0.21 ounce gold per ton. The "South Zone" may also extend west of the diabase as indicated by diamond drilling.

MCFINLEY RED LAKE MINES LTD.

McFinley Red Lake Mines Ltd. has been exploring its property in Bateman Township, 7 km northeast of the town of Cochenour, since 1974. Portions of this property were originally staked in 1926 and subsequently subjected to numerous surface explorations. In 1944, McFinley Red Lake Gold Mines Limited was incorporated and acquired a group of 30 claims on which they carried out more surface exploration. In 1956 and 1957, Little Long Lac Gold Mines Limited financed an underground exploration program. Levels were established at 45, 84, and 122 m. Work was suspended in July 1957. In 1984, after ten years of surface exploration, an underground exploration program was initiated. The shaft was rehabilitated, 3353 m of drifting and crosscutting was performed, one vent raise and two raises for bulk sampling have been completed, and three more raises are currently being driven. Bulk samples of several thousands of tons each, from several mineralized zones, will be processed by their surface test facility. This plant consists of jaw, cone and ball crushers, jigs, shaker tables, and cyanide leach. This test plant is capable of processing 150 tons per day and is expandable. All surface facilities can be used for full production if such a decision is made after the bulk samples are processed. Extreme nugget effects have made estimations of tonnage and grade an almost impossible task, necessitating extensive bulk sampling. Although published reserves are 890 000 tons grading 0.19 ounce gold per ton, metallurgical tests suggest the grade could be as high as 0.41 ounce gold per ton. Bulk sample processing was imminent at year-end.

Gold mineralization at the McFinley Mine is hosted by amphibolite grade, tholeiitic, pillowed mafic volcanic rocks, ultramafic intrusions, quartz-feldspar porphyry, diorite, iron formation, and cherty fragmentals. All lithologies except the diorite are moderately to highly strained and hydrothermally altered. The mine lies within the northeast-trending East Bay Deformation Zone and the Highly Altered Zone, first defined by Pirie (1981) as an area in which all past producing and current gold producing mines in Balmer and Dome Townships are found. The high strain is expressed as moderately to strongly developed foliation in most rocks, and locally, by schistosity. The least altered mafic volcanic rocks contain 35 percent hornblende, 35 percent feldspar, 10 percent biotite, 5 percent epidote, 2 percent carbonate, and l percent chlorite, while strongly altered mafic volcanic rocks contain 10 percent amphibole, 15 percent albite, 20 to 50 percent biotite, 20 percent carbonate, 15 percent muscovite, 10 percent chlorite, 5 percent quartz, and 3 percent epidote. Hydrothermal alteration has rendered the ultramafic rocks into talc-carbonate-chlorite schist. The quartz-feldspar porphyries are sericitic. The iron formations range in thickness from 0.5 to 5 m. They are dominantly sulphide facies (pyrite-pyrrhotite), however, magnetite, carbonate, and hornblende are also found within them. Bedding, defined by chert and iron sulfides, is disrupted but recognizable. These interflow sediments define a northeast-striking (45°), north-west dipping (50 to 70°), monoclinal sequence with northwest stratigraphic tops. Individual interflow sedimentary units are boudinaged, which permitted the influx of secondary hydrothermal fluids, especially in the necks of the boudins. Strain in the enclosing mafic volcanic rocks increases toward the sedimentary contacts, as evidenced by pillow elongation and increasing foliation intensity. Although the strike of the foliation is parallel to lithologic contacts, it dips more steeply to the west than the contacts and is at an oblique angle to the contact with the ultramafic rocks. The ultramafic unit is S-folded about an axis which plunges 17° to the southwest. This folding, in conjunction with the presence of stretching lineations plunging steeply to the northeast, suggest the area has undergone reverse shearing. The entire sequence and the enclosed gold mineralization is cut by a late, east-trending fault (Shaft Fault).

Several types of mineralized and unmineralized veins occur at the McFinley Mine and are described below in their probable order of emplacement: I) early quartz-carbonate veins, 1 to 2 cm thick, which are present in all units at various stages of deformation; 2) quartz-chlorite-pyrite-tourmaline veins which form extensional fractures generally confined to iron formation and quartz-feldspar porphyry; 3) quartz-pyrite-arsenopyrite veins, 2 cm to 1 m thick, with variable amounts of late sphalerite and galena (B- and D-Veins); 4) quartz-pyrite-arsenopyrite veins 0.3 m to 2 m thick, which contain 2 to 30 percent fine-grained disseminated sulphides (C-Zone); 5) quartz-chlorite-gold veinlets, 0.5 cm thick, which subparallel the iron formation. Vein types 3, 4, and 5 are significant for gold and occur as follows:

I. Iron Formation/Chert Units: Within the mine workings, nine or possibly ten separate iron formation units have been encountered. Two of these units have been well explored and contain significant amounts of gold mineralization. The gold occurs as spectacular accumulations of coarse, free gold where thin, obliquely cutting quartz-chlorite veinlets intersect sulphide layers. Low grade mineralization also occurs in sulphide-rich zones containing arsenopyrite and coarse pyrite, usually located at the footwall and hanging wall contacts of the iron formation.

2. Fine-Grained Quartz-Pyrite-Arsenopyrite Veins: These veins are found to be well mineralized close to the talc-chlorite schist roll structure (C-Zone). They are composed of fine-grained quartz, minor carbonate, pyrite, pyrrhotite, arsenopyrite, and sphalerite. These structures are 50 m long and 1 to 2 m wide, and laminated, but do not show the same continuity as the iron formation, possibly due to the higher degree of shearing in this area. These zones may be highly deformed iron formations. On the 50 m level, the C-Zone comprises three such structures.

3. D-Vein and B-Vein Zone: These zones constitute a single vein which is subparallel to, and cuts, the iron formation units. They are designated separate names because the bodies are separated by the Shaft Fault. The D-Vein is at least 300 m long and 0.1 to 1 m thick. It is composed of variable amounts of sphalerite, pyrite, pyrrhotite, rounded arsenopyrite fragments, galena, and boudinaged 0.3 to 0.6 m long quartz-carbonate-arsenopyrite veins. Native gold and silver have also been found in the D-Vein. The B-Vein is characterized by similar mineralogy to the D-Vein, but is thinner (2 to 5 cm), contains coarser arsenopyrite and quartz-carbonate and less sphalerite. Both of these veins are found in an early, foliation-parallel shear. Down dip on these structures, 10 m wide zones of pyrite-arsenopyrite-pyrrhotite wallrock replacement occur.

GOLDEN TERRACE RESOURCES CORPORATION, RICHARDSON LAKE PROSPECT

Golden Terrace Resources Corporation has been exploring its property on Richardson Lake, 115 km northeast of Red Lake, since 1985. In January 1985, Golden Maverick Resources Corporation optioned 33 claims from the Kostynuk brothers of Red Lake. In September 1985, Golden Maverick amalgamated with Golden Terrace. The property has been explored since the early 1930s. In 1958, the Kostynuk brothers discovered an outcrop of heavy arsenopyrite and pyrite mineralization associated with a siliceous breccia. Significant gold values were found adjacent to a quartz vein bearing visible gold, minor sphalerite, and galena. In 1959, the Kostynuk brothers optioned the property to Dome Exploration who carried out a diamond drilling program at the discovery site. East-trending structures and geophysical anomalies dictated north-south drilling, and of nine holes drilled, only one intersected significant gold values. The option agreement was subsequently terminated.

During the period 1963 to 1966, the Kostynuk brothers carried out a small scale mining operation by sinking a 15 m shaft and drifting for approximately 30 m. Free gold was won from a quartz vein within the broader mineralized zone by processing with an on-site gravity mill. A total of 577 tons of ore were processed and 1126 ounces of gold were recovered.

In early 1986, assuming that the cherty breccia was controlled by east-west stratigraphy, Golden Terrace drilled near the discovery. The results were encouraging. Field work in 1986 and a reassessment of data led the company to believe the mineralized zone is northtrending. A drilling program in 1987, which accomodated this north-south concept, was very successful, and by year-end 200 000 tons of gold mineralization on the discovery zone had been delineated. A second mineralized zone has also been discovered. The discovery zone strikes 165° and plunges to the southwest. It is 3 to 10 m in thickness, has a strike length of 150 m, and to date, has been drilled to a depth of 180 m. It is hosted by a breccia with drusy chert, jasperoid, and magnetite-rich fragments in a mafic matrix. An alteration zone of iron carbonate, sericite, and silica envelopes the mineralization. The mineralization consists of a few quartz veins with free gold and traces of base metal sulphides bounded by a broad zone rich in arsenopyrite, pyrite, and gold. On a more regional scale, the mineralization is hosted by highly strained clahtic metasediments and mafic volcanic rocks which trend 65°. More gold mineralization has been found along this zone which is currently being explored by Golden Terrace. To the immediate north of the discovery, a large granodiorite body with quartz veins and alteration has been found.

ST. JOE CANADA INC., HORSESHOE ISLAND

St. Joe Canada Inc. has been exploring its Horseshoe Island Prospect on Birch Lake, 105 km northeast of Red Lake, since 1983. This gold occurrence has been worked on for a number of years; the earliest record of its existence is a vein indicated at the site of mineralization on Ontario Department of Mines Map No.45c (Harding 1936). Twenty diamond-drill holes were collared from the lake toward the southeastern shore of the island in 1944. Karl Kozeur, an old-time resident and prospector of Birch Lake, staked the ground in 1969. These claims were optioned to Sudbury Contact Mines Limited who drilled northeast of the island in 1970. The ground was restaked in 1974 by Goldsearch Ltd. who conducted a geophysical survey. The currently known mineralized zone is coincidental with a magnetic anomaly defined by the survey. These claims were subsequently cancelled and Karl Koezeur repeatedly staked the ground between 1976 and 1979. Russell Fontaine staked the ground in 1981 and optioned it to Minorex Ltd. The claims were cancelled the following year. St. Joe staked the ground in 1982 after following up on leads provided by another old-time resident of Birch Lake, Oscar Peterson. From early 1984 to early 1986, St. Joe completed 57 diamond-drill holes totalling 8919 m. In August 1986, St. Joe entered into a joint venture with Nexus Resource Corporation in which Nexus could earn a 40 percent interest in the property by spending $3 million over three years. The first phase of exploration by the joint venture, which consisted of 11 779 m of drilling, was completed by December 1986. This drilling, along with previous programs, has outlined 775 000 tonnes grading 4.5 g/t gold (850 000 tons of 0.13 ounce gold per ton) over an average true width of 4.2 m in the Horseshoe Island A-B mineralized zone. Approximately 1500 m of drilling was performed early in 1987.

Gold mineralization occurs in two zones (A-B and C Zones) of fine disseminated pyrite (0.5 to 1 percent). These zones are enveloped within a 10 to 50 m wide alteration zone consisting of sericite, quartz, hematite, magnetite and/or ilmenite, the latter often altered to leucoxene. The C Zone is found along the east-trending contact margin of a feldspar porphyry at the northern contact of a conglomerate. The western half of the A-B Zone occurs along the southern contact of the same conglomerate, now trending east-southeast. To the east, the east-trending stratigraphy is cut by granodiorite, and the A-B Zone wraps around the southern tip of the intrusion to strike northeast. The length of the A-B Zone is 380 m while the enveloping alteration zone is 450 m long. Gold is commonly visible and its tenor is proportional to the pyrite content. Traces of chalcopyrite and tourmaline have also been reported from the mineralized zone.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

G.P. Beakhouse completed l:15 840 scale mapping of the Birch Lake area started in 1985 and 1986 (Beakhouse 1985; Beakhouse and McNeil 1986; Good 1985, 1986). P.C. Thurston conducted a reconnaissance reevaluation of several of the northern greenstone belts in the Red Lake District (Thurston *et al.* 1987).

RESEARCH BY OTHER AGENCIES

John Stix (University of Toronto) has carried out detailed mapping and sampling of subaqueous pyroclastic rocks in the Confederation Lake area.

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3. Sioux Lookout Resident Geologist's Area—1987

D.A. Janes

Resident Geologist, Ontario Ministry of Northern Development and Mines, Sioux Lookout

INTRODUCTION

The Sioux Lookout office is presently staffed by D.A. Janes, Resident Geologist and M.O.P. Roy, Geological Secretary. The position of Staff Geologist, which has been vacant for some time, will be filled in January 1988.

R. Spooner is the Mining Recorder for the Patricia Mining Division, D. Cosco is the Recording Office Clerk and S. Kemash is the Assistant Recording Office Clerk. P. Glover is the Claims Inspector for the Patricia Mining Division.

During 1987, a number of contract staff were employed in a variety of tasks. C.J. Proctor is in the second year of a two-year contract to prepare Geological Data Inventory Folios. J.W. Redden completed an Industrial Minerals Inventory and wrote an Open File Report on the results of his study. He was assisted for a portion of the year by A.M. Stechishen. M.T. Roy and P. Closen conducted a core retrieval and salvage operation during the Summer of 1987. The program was run as an adjunct to the Canada-Ontario Mineral Development Agreement (COMDA) project for the Sturgeon Lake Mining area. At present, M.T. Roy is employed as a Geological Technician assisting the Resident Geologist.

J. Lacosse is employed as a Clerk Typist in the Mining Recorder's Office and S. Turnbull assists the Claims Inspector.

The year 1987 continued a four-year trend of high levels of claim staking, mining exploration; and assessment work. Claim staking remained close to the ten-year record setting level of 1986 and in the neighbourhood of 6000 claims should be recorded by year-end. Other indices of activity, such as diamond drilling, geological and geophysical surveys, and assessment work in general, will set fifteen-year highs for the Patricia Mining Division. The number of active claims exceeded 18 500 for the first time in the Mining Division's history and should be close to 19 000 claims by 1987 year-end. The total cost of reported exploration exceeds $24 million, and with the mining developments in the Uchi and North Caribou Lake Belts, total expenditures for the year should exceed $40 million. One result of this boom in activity has been a revitalization of the Town of Pickle Lake which had shrunk to a quarter of its former population after the closure of the Thierry Mine in 1981 by Umex Incorporated.

Mineral exploration activity in the Patricia Mining Division continues the trend set in 1981, in that at least 90 percent of the activity is oriented toward gold. Activity is concentrated in the Central Uchi Belt and the North Caribou Lake Belt; however, significant exploration has returned to the Wabigoon and Big Trout Lake portions of the Mining Division. The area around Goldlund Mine in Echo Township has been quite active since the Spring of 1987 and several exploration programs, with accompanying drill campaigns, are active at present. The Sturgeon Lake area is busy with a number of programs under way around King Bay and to the north near Ouillette Lake.

In April of 1987, the Ontario Geological Survey released an airborne survey, centred on Dryden, which extended into the Sioux Lookout area and adjoined the Sioux Lookout geophysical survey, released several years ago. Essentially all of the Wabigoon Volcanic Belt, within the Patricia Mining Division, is now covered by recent, high-resolution geophysical surveys initiated by either the Province of Ontario or by private groups.

The Ontario Geological Survey continued mapping in the Patricia Mining Division in 1987. Three projects were operated. L.S. Jensen mapped the Horseshoe Lake Belt northwest of Pickle Lake. B.R. Berger extended his previous year's work into the Kenora Mining Division, south of Goldlund Mine. L.B. Chorlton continued her combined structural—metallogenic study, in conjunction with Berger's mapping project, and developed a very interesting interpretation of the Goldlund—Sandybeach Lake area.

The Mattabi (Mattabi Mines Limited) and Lyon Lake Mines (Noranda Incorporated) on Sturgeon Lake continued in production through 1987. The Thierry Mine (Umex Incorporated), at Pickle Lake, remained in a "care and maintenance" state during 1987. Recently, Umex has indicated that they will be removing underground equipment and will probably dismantle the mine, since they believe that the likelihood of reopening the operation in the foreseeable future is low. The Goldlund Mine, in Echo Township, has passed to the control of Cameco Incorporated. They are conducting an active exploration program on their adjoining claim blocks.

Placer Dome Incorporated have announced that they will bring their Dona Lake Property, 11 km south of Pickle Lake, into production. St. Joe Canada Inc. have announced that they will bring into production their Golden Patricia Property, which is located near Muskegsagagen Lake, some 70 km southwest of Pickle Lake. The Musselwhite Syndicate (Placer Dome Incorporated, operator) has announced a new deposit on the Opapimiskan Lake structure. This group of zones, termed the "East Bay Group", (formerly the Snoppy Lake zone), is undergoing intense evaluation with a view to a feasibility study in 1988 (The Northern Miner, September 7, 1987). This is in addition to the original West Anticline Deposit, which has mineral inventory developed by drilling and underground development.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist's program was somewhat constrained during 1987 by the absence of a full-time Staff Geologist. J.W. Redden completed an Industrial Minerals Study and wrote an Open File Report which will be published in 1988. A program to retrieve and safely store exploration core from the South Sturgeon Lake base metal area was run jointly with Mattabi Mines Limited and the Geological Survey of Canada. Some 23 000 m of drill core were reboxed and stored at a secure site on the Mattabi Property.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 3.1

Number on Figure	Individual or Company	Activity
1	ALBERT, VICTOR	MANUAL WORK IN WEBB TOWNSHIP
2	ARCHON MINERALS INC	POWER STRIPPING IN BECKINGTON LAKE AREA
3	ARMSTRONG, G BEST, A	DIAMOND DRILLING IN THE BECKINGTON LAKE AREA
4	ATEBA MINES INC	DIAMOND DRILLING IN THE KAWASHE LAKE AREA
5	BENDERITE, ADAM	STRIPPING IN THE SQUAW LAKE AREA
6	CANADIAN CONTINENTAL OIL CORPORATION	GEOLOGICAL AND MULTI-ELEMENT ASSAY WORK IN THE DOMA LAKE AREA
7	CANLORM RESOURCES INC	MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE WESLEYAN LAKE AREA
8	COMINCO L	AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS IN MCVICAR LAKE AREA
9	CUMBERLAND RESOURCES L	DIAMOND DRILLING IN THE EVANS LAKE AREA; ASSAYS AND GEOLOGY IN THE EVANS LAKE AREA
10	DOME EXPLORATION (CANADA) L	DIAMOND DRILLING IN THE DOMA LAKE AREA; MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE ACHAPI LAKE AREA; DIAMOND DRILLING IN KAWASHE LAKE AREA; DIAMOND DRILLING IN NAUGO LAKE AREA; DIAMOND DRILLING IN THE TARP LAKE AREA; DIAMOND DRILLING IN SEEMEL LAKE AREA
11	DURATION MINES L WILSHIRE ENERGY RESOURCES L	DIAMOND DRILLING, MAGNETIC AND ELECTROMAGNETIC SURVEYS, GEOLOGICAL WORK AND ASSAYS IN THE MCVICAR LAKE AREA; DIAMOND DRILLING IN THE MEEN LAKE AREA
12	ELDOR RESOURCES L	DIAMOND DRILLING IN ERICHSEN LAKE AREA
13	ESSO RESOURCES CANADA L	DIAMOND DRILLING IN TARP LAKE AREA
14	GOLDEN RANGE RESOURCES INC	GROUND MAGNETIC AND ELECTROMAGNETIC SURVEYS IN PARNES LAKE AREA
15	GOLDEN TERRACE RESOURCES CORP	DIAMOND DRILLING AND ASSAYS IN LITTLE OCHIG LAKE AREA; DIAMOND DRILLING IN MATAPESATAKUN BAY AREA
16	HBOG	TRENCHING IN SAVANT LAKE AREA
17	INLET RESOURCES PURE GOLD RES INC	GEOLOGICAL AND ROCK GEOCHEMICAL WORK IN ACHAPI LAKE AREA
18	KERR ADDISON MINES L	DIAMOND DRILLING IN FIRSTLOON LAKE AREA; DIAMOND DRILLING IN JOHNSTON BAY AREA
19	LOCATOR EXPLORATIONS	AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS AND DIAMOND DRILLING IN MCVICAR LAKE AREA
20	MCCOMBE, ROBERT J	TRENCHING IN KABIK LAKE AND PICKEREL TOWNSHIP AREA
21	MINE LAKE MINERALS INC	POWER STRIPPING IN BECKINGTON LAKE AREA
22	MISTANGO CONSOLIDATED RESOURCES L	DIAMOND DRILLING IN SQUAW LAKE AREA
23	MONETA PORCUPINE MINES INC	DIAMOND DRILLING IN VERMILION TOWNSHIP
24	NORANDA EXPLORATION C L	GEOLOGICAL WORK IN DRUM LAKE AREA; DIAMOND DRILLING IN DUFFEL LAKE AREA
25	NORTHERN DYNASTY	GEOCHEMICAL WORK IN ACHAPI LAKE AREA; DIAMOND DRILLING IN RANDALL LAKE AREA; DIAMOND DRILLING IN WRIGHT LAKE AREA
26	ORACLE RESOURCES L	DIAMOND DRILLING AND ASSAYS IN KEEYASK LAKE AREA (AGUTUA ARM); DIAMOND DRILLING, GEOPHYSICAL WORK IN SKINNER LAKE AREA
27	POWER EXPLORATION	DIAMOND DRILLING AND ASSAYS IN CALEY LAKE AREA; DIAMOND DRILLING AND ASSAYS IN COUCHEEMOSKOG LAKE AREA; DIAMOND DRILLING AND ASSAYS IN FIRSTLOON LAKE AREA; DIAMOND DRILLING AND ASSAYS IN KAWASHE LAKE AREA; DIAMOND DRILLING AND ASSAYS IN LITTLE OCHIG LAKE AREA; DIAMOND DRILLING AND ASSAYS IN MEEN LAKE AREA
28	PURE GOLD RESOURCES INC	DIAMOND DRILLING IN ACHAPI LAKE AREA; GEOLOGICAL REPORT, DIAMOND DRILLING AND ASSAYS IN WEIBERG LAKE AREA; DIAMOND DRILLING IN ATIKOKIWAM LAKE AREA
29	SHERRITT GORDON MINES L	DIAMOND DRILLING IN FRY LAKE AREA
30	ST. JOE CANADA L	DIAMOND DRILLING AND ASSAYS IN KAWASHE LAKE AREA
31	STEEP ROCK RESOURCES INC	POWER STRIPPING IN FOURBAY LAKE AREA
32	SUNBURST EXPLORATION L	DIAMOND DRILLING IN COUCHEEMOSKOG LAKE AREA
33	UMEX INC	AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS IN ARMIT LAKE AREA; AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS IN EVANS LAKE AREA; DIAMOND DRILLING, MAGNETIC AND ELECTROMAGNETIC SURVEYS IN FIRSTLOON LAKE AREA; DIAMOND DRILLING IN FRY LAKE AREA; DIAMOND DRILLING IN MEEN LAKE AREA
34	UTAH MINES L	DIAMOND DRILLING IN MCVICAR LAKE AREA
35	VAN HORNE GOLD MARIETTA RESOURCES CORP ORACLE RESOURCES	DIAMOND DRILLING IN TARP LAKE AREA

All operating and shut down mines in the Division were visited at least once. Two of the three Ontario Geological Survey mapping parties located within the Mining Division were visited. Unfortunately, the party working on Horseshoe Lake could not be visited due to time and logistical constraints. Several lectures were given to local secondary schools and Junior Ranger Camps by the Resident Geologist and staff.

Field trips were made to several of the operating mine and development sites, and a number of property visits were done in the Sturgeon, Echo, and Minnitaki Lakes areas.

DEVELOPMENT PROJECTS

Placer Dome Incorporated have commenced construction of a 500 tons per day gold mill on the Dona Lake property, 11 km southeast of Pickle Lake, to exploit reserves of 2.0 million tons at 0.193 ounce gold per ton. The mine should employ between 120 and 130 people. The gold will be recovered by conventional milling, cyanidation and carbon-in-pulp treatment, with an estimated recovery of 95 percent. In 1985 and 1986, a development shaft was sunk to 160 m and limited drifting was done on the 100 m and 160 m levels. A production shaft will be sunk to the 320 m level. Cut-and-fill mining technique will be used. The power line will be completed by the end of 1987; the shaft collar is in place and sinking will start in February 1988. Surface plant construction will start in April and full production is expected by March of 1989. The project will cost $42.5 million and the cost per ounce of gold is expected to be about $280. Mine life is estimated to be ten years.

St. Joe Canada Inc. is negotiating with the Ontario Government and various local groups, prior to starting construction of a 150 tons per day gold mill on their Golden Patricia Property at Muskegsagagen Lake. They have announced ore reserves of 868 000 tonnes at a grade of 0.58 ounce gold per ton (The Northern Miner, July 14, 1986, p.6). The company has completed two declines and is completing underground ore development and reserve calculations. The mine will be a fly-in operation; a 5000-foot long airstrip is under construction, along with a power line to be connected to the Ear Falls–Pickle Lake power line, which passes close to the property.

Noramco Exploration Incorporated has taken over exploration of the Pickle Crow Mine (The Northern Miner, October 9, 1987). The mine has been dewatered to the 750-foot level and is undergoing rehabilitation and evaluation of ore potential by underground drilling and sampling. Considerable surface work is underway, with the emphasis on the higher grade quartz veins. The underground emphasis is on the potentially larger tonnage sulphide replaced iron formation. Tentative plans are to rehabilitate the shaft and to extend ore evaluation and sampling on the lower levels (Canadian Institute of Mining and Metallurgy Talk, Ignace, October 28, 1987)

MINING ACTIVITY

Mattabi Mines Limited and Noranda Mines Limited, Lyon Lake Division, are located on south Sturgeon Lake in the Patricia Mining Division. Mattabi Mines Limited is owned by Noranda Mines Limited (60 %) and Abitibi Price Incorporated (40 %). Ore from both operations is milled at the Mattabi mill to produce zinc, copper, and lead concentrates. Present milling rate is approximately one million tons per year. At present, 325 people are employed at both operations. The Mattabi Mine is scheduled to exhaust reserves in the third quarter of 1988. At that time, the mill will be downsized to run from the Lyon Lake Deposit. In preparation for this, employment will be reduced to 220 employees. Continuation of the operation will depend on economic conditions.

Noranda Exploration Company Limited, in cooperation with Mattabi Mines Limited and the Governments of Canada and Ontario, are conducting geoscience studies to aid in exploration for additional ore reserves in the Sturgeon Lake mining camp, under the Canada–Ontario Mineral Development Agreement. This program, managed by the Geological Survey of Canada, has indicated geological guidelines which will aid in the exploration program.

The Thierry Mine, owned by Umex Incorporated, is located just north of Pickle Lake and remains closed. The mine, when operating, milled 3000 tons per day and produced copper–nickel concentrate. Until recently, Umex maintained the property under "care and maintenance" status. The management of Umex has decided that the probability of reopening the mine in the near future is so low that they will dismantle the operation. Several major pieces of equipment have been removed as a consequence of this decision.

The Goldlund Mines in Echo Township is now under the control of Camreco Incorporated. The mine is shut down and has flooded. The mill, which consists of a 400 tons per day grinding and flotation circuit, is mothballed and can be readily activated. Camreco is conducting an extensive geological reevaluation of their holdings in the area. A major drill program is underway in Echo and Laval Townships.

MINERAL EXPLORATION ACTIVITY

1987 continued the trend of the past three years, in that mining exploration within the Division has increased roughly 50 percent over the previous year. Approximately 5500 claims were staked in an eleven-month period in 1987, which compares to some 7800 claims staked in all of 1986. Active claims increased to just under 18 000 and diamond drilling doubled to approximately 245 000 feet. Geophysical and geological surveys showed similarly large increases.

The increases in exploration activity from about 1985 on, have been fueled largely by the Ontario Mineral Exploration Program (OMEP) and the flow-through provisions of the Canada Income Tax Act (*see* Table 3.4). In order to estimate what effect this expenditure has had on exploration and how efficient it has been in developing new ore bodies, the total expenditure from 1980 to the present for the Uchi and North Caribou Belts within the Patricia Mining Division has been calculated by the author. It is in the order of $90 million, based on reported exploration assessment work. This excludes work on patented claims, and work done for mine development. Some $76 million of this is estimated to have been

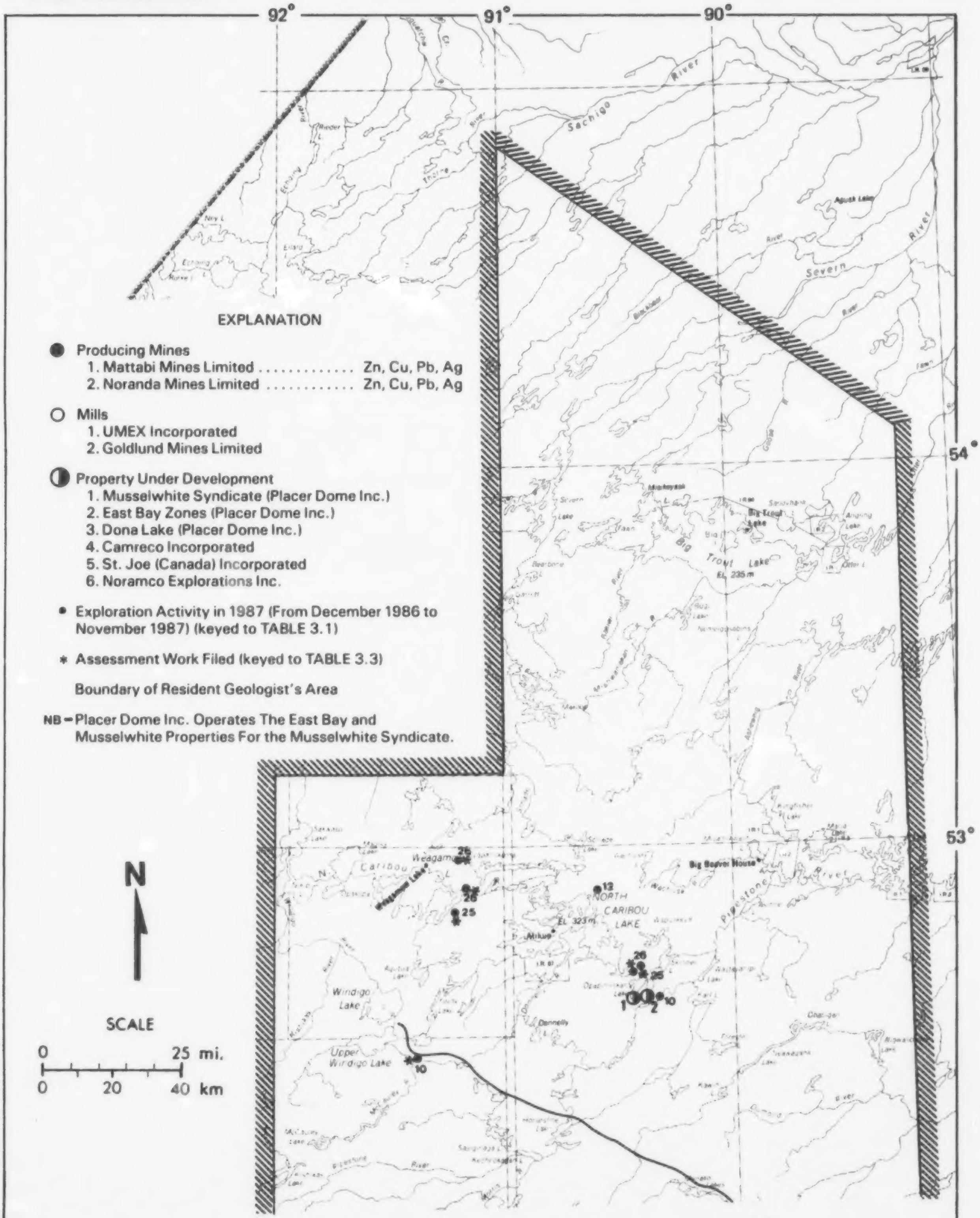
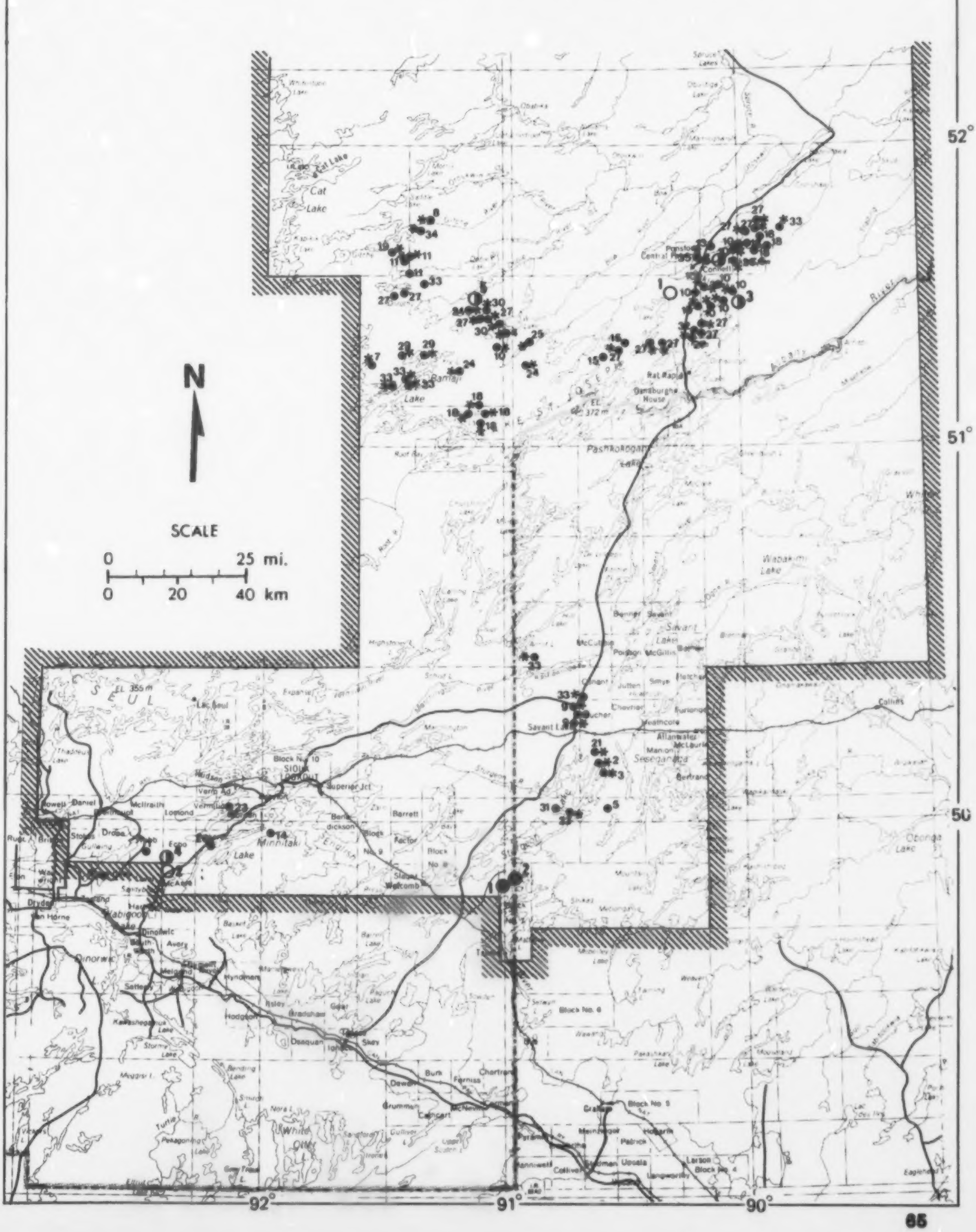

92°
91°
90°
54°
53°
Sachigo River
Severn River
River
Agusk Lake
Big Trout Lake
EL 235m
Big Beaver House
Weagamow Lake
Caribou L
NORTH CARIBOU LAKE
EL 323m
Pipestone River
Windigo Lake
Upper Windigo Lake
Dennelly L
EXPLANATION
Producing Mines
1. Mattabi Mines Limited .... Zn, Cu, Pb, Ag
2. Noranda Mines Limited .... Zn, Cu, Pb, Ag
Mills
1. UMEX Incorporated
2. Goldlund Mines Limited
Property Under Development
1. Musselwhite Syndicate (Placer Dome Inc.)
2. East Bay Zones (Placer Dome Inc.)
3. Dona Lake (Placer Dome Inc.)
4. Camreco Incorporated
5. St. Joe (Canada) Incorporated
6. Noramco Explorations Inc.
Exploration Activity in 1987 (From December 1986 to November 1987) (keyed to TABLE 3.1)
Assessment Work Filed (keyed to TABLE 3.3)
Boundary of Resident Geologist's Area
NB – Placer Dome Inc. Operates The East Bay and Musselwhite Properties For the Musselwhite Syndicate.
N
SCALE
0
25 mi.
0
20
40 km
25
26
12
10
1
2

Figure 3.1a
Sioux Lookout Resident Geologist's Area

Adjoins Figure 3.1b

Figure 3.1b
Sioux Lookout Resident Geologist's Area


N
SCALE
0
25 mi.
0
20
40 km
52°
51°
50
92°
91°
90°
Cat Lake
Central Patricia
Pickle Lake
Ramah Lake
Pashkokogan Lake
St. Joseph
Savant Lake
Sturgeon Lake
Wabakimi Lake
Lac Seul
Sioux Lookout
Superior Jct.
Minnitaki Lake
Dryden
Wabigoon
Dinorwic
Ignace
Savant Lake
Osnaburgh House
Collins
Ogoki Lake
Albany River

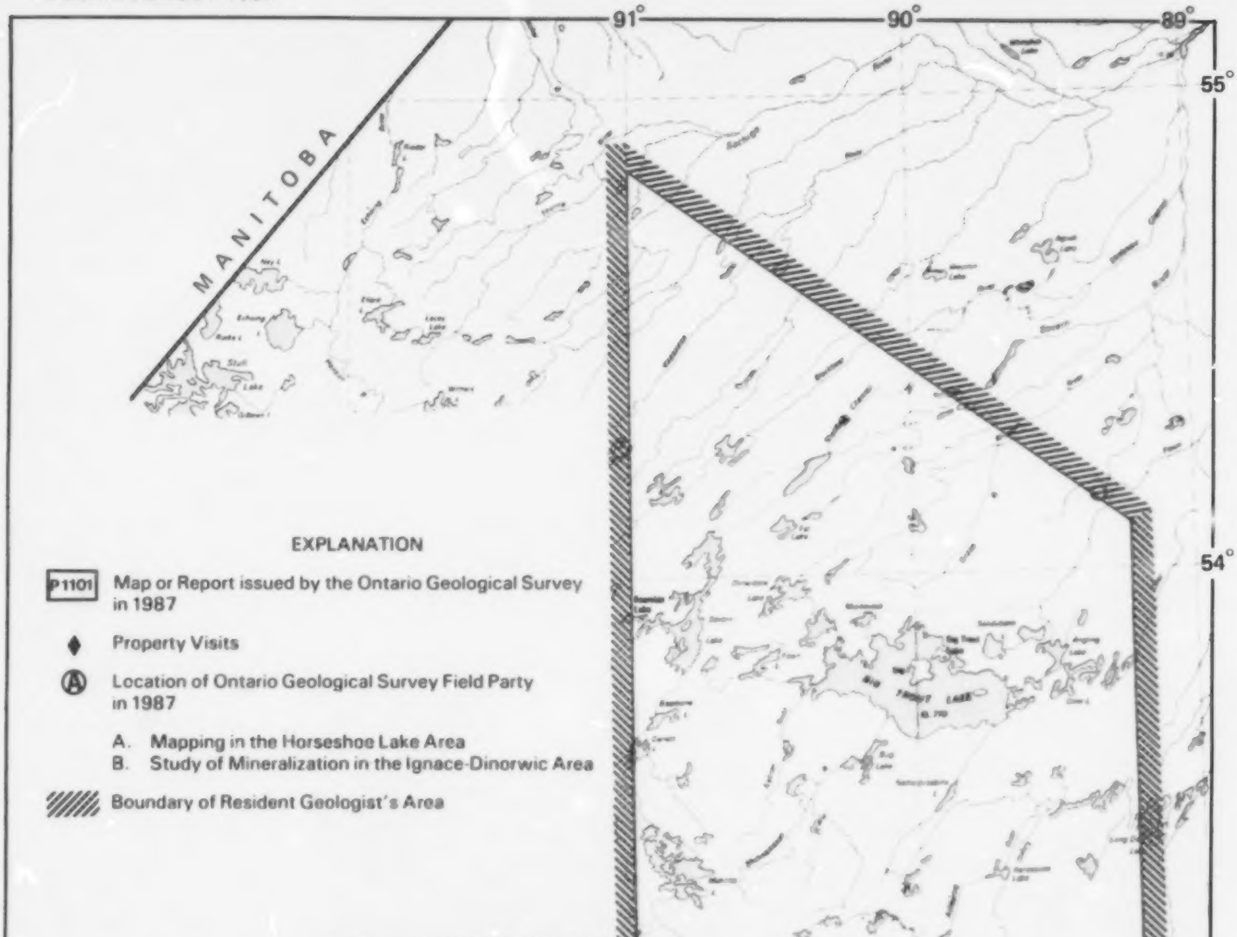
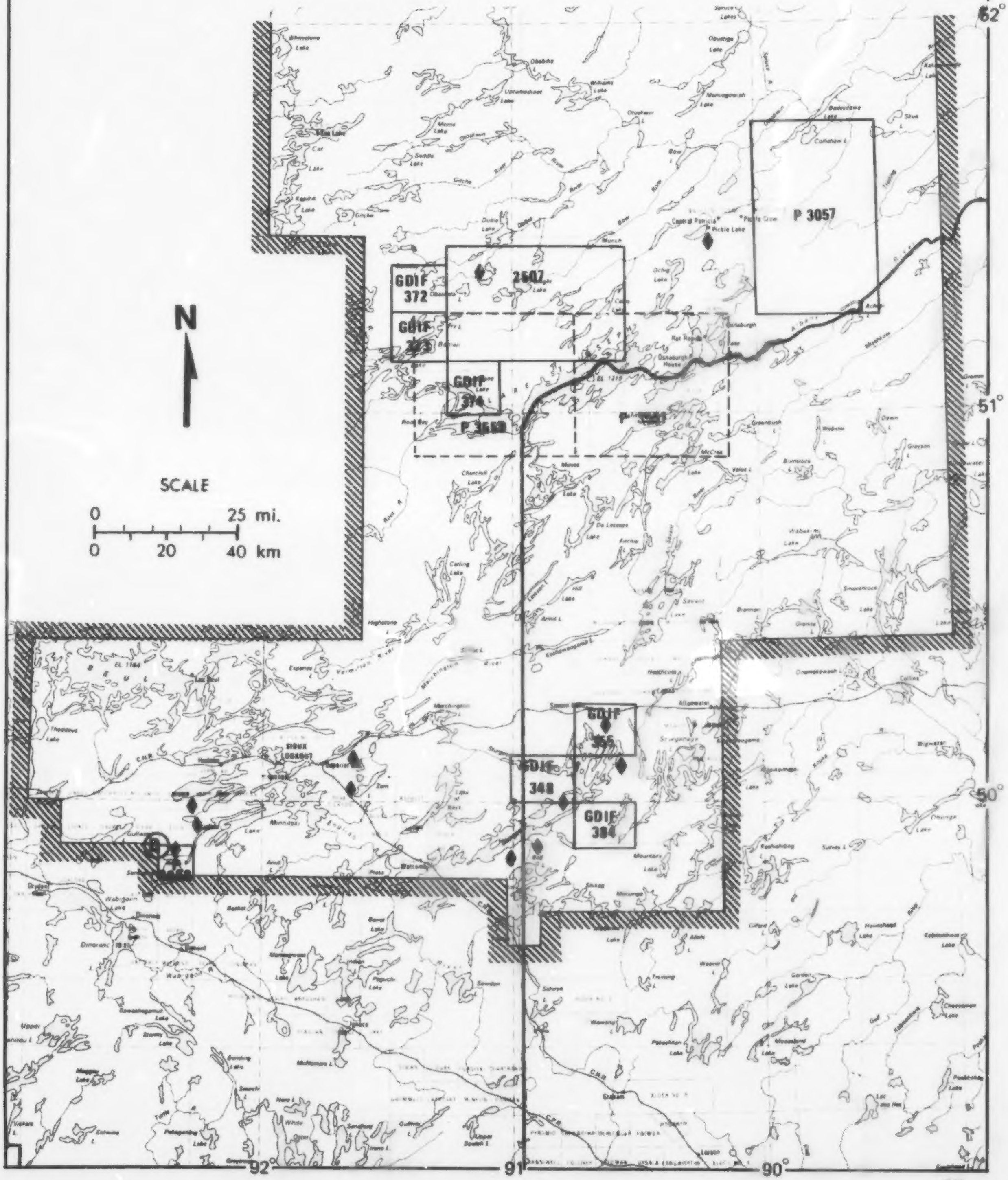

91°
90°
89°
55°
54°
53°
52°
MANITOBA
PATRICIA
EXPLANATION
P1101 Map or Report issued by the Ontario Geological Survey in 1987
♦ Property Visits
Ⓐ Location of Ontario Geological Survey Field Party in 1987
A. Mapping in the Horseshoe Lake Area
B. Study of Mineralization in the Ignace-Dinorwic Area
▨ Boundary of Resident Geologist's Area
BIG TROUT LAKE
P 3040
NORTH CARIBOU LAKE
P 3080
P 3081
Ⓐ
N
SCALE
0
25 mi.
0
20
40 km

Figure 3.2a
Sioux Lookout Resident Geologist's Area

Adjoins Figure 3.2b

Figure 3.2b
Sioux Lookout Resident Geologist's Area


N
SCALE
0 25 mi.
0 20 40 km
52°
51°
50°
92°
91°
90°
GDIF 372
GDIF 373
GDIF 374
P 3057
GDIF 355
GDIF 348
GDIF 384
Central Patricia
Pickle Lake
Rat Rapids
Osnaburgh House
SIOUX LOOKOUT
Dryden
Wabigoon
Ignace
CNR
CPR

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

* CORRECTED FIGURES OF 1986 (ADDITIONAL WORK NOT SHOWN IS INCLUDED IN THE TOTAL MAN DAYS)

** 1987 FIGURES UP TO AND INCLUDING NOVEMBER(ADDITIONAL WORK NOT SHOWN IS INCLUDED IN TOTAL MAN DAYS)

TABLE 3.2

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1974	1,011	3,223	5,659	38,049.0	6,255	102	44,406
1975	1,019	2,489	3,903	38,492.7	18,953	1,858	59,303.7
1976	1,185	1,120	3,958	27,111.0	11,555	185	38,851
1977	1,261	1,320	3,769	17,880.1	13,931	946	32,757.1
1978	2,018	765	5,084	33,371,3	57,501	600	91,472.3
1979	1,012	1,061	5,045	30,869	27,605.4	1,949	60,423.4
1980	3,485	1,391	7,068	42,633	13,524	10,800	66,957
1981	2,861	1,582	8,303	42,588	232,184	4,866	287,626
1982	842	1,766	7,737	35,329	73,486	13,930	167,289
1983	4,398	1,164	10,971	69,563.8	85,536.5	23,730	197,223.1
1984	5,009	4,074	10,625	42,425	113,830	24,941.1	205,214.64
1985	2,513	3,972	9,166	92,051	148,105	20,376	294,891
1986*	7,815	3,046	13,935	109,952.4	263,118.4	29,245.4	429,481.5
1987**	5,490	1,838	17,587	243,907.04	341,609.6	45,180	668,928.2

spent in the above mentioned Belts. A recent compilation of published ore reserves for gold give an aggregate of 2.63 million ounces at a grade somewhat in excess of 0.2 ounce per ton. The present gross value of the contained gold is approximately $1.6 billion. This gives an average cost of exploration of $30 per ounce, or less than five percent of the selling price of an ounce of gold.

Most of the work carried out in the past year was focussed in the Uchi Subprovince and ranged from the west, border of the Patricia Mining Division up to, and including extensions into, the Thunder Bay Mining Division. The activity in the western, central and eastern portions of the North Caribou Belt showed considerable increases; the recent announcement by Placer Dome Incorporated of the mineral inventory on the East Bay Zones will certainly increase the already high level of activity in this area. Exploration has been wide spread throughout the area and was done by a number of companies, as shown in Tables 3.1 and 3.2. The importance of OMEP is shown in Table 3.4; exploration expenditures of some $21.5 million were partially funded by this program.

Exploration by Power Explorations Incorporated, Santa Maria Resources Limited and a host of other junior companies working in the Division, have augmented the efforts of Placer Dome , St. Joe Canada, Kerr Addison Mines Limited and Utah Mines Limited through a number of joint ventures and independent programs. Most of the activity is centred on iron formation-hosted gold deposits but significant exploration of polymetallic quartz vein deposits has occurred near Randall and Capella Lakes in the North Caribou Belt. The Musselwhite Syndicate has continued its very successful exploration program on the Opapimiskan Lake structure with the development of the East Bay (Snoppy Lake) Deposit. Nearby, Santa Maria Exploration reported a very good intersection near Zeemel Lake in this productive iron formation environment (The Northern Miner, October 5, 1987). Intensive exploration occurred around St. Joe's Golden Patricia Property on Muskegsagagen Lake. St. Joe has announced an additional zone in the area, the Dobie Zone, which contains some 300 000 tons at 0.15 ounce gold per ton. In Pickle Lake, Noramco Exploration, having taken over management of Highland Crow Resources Limited, continued with an intensive underground and surface exploration program which has produced a number of new prospective zones.

Activity increased in the Sturgeon Lake area, with considerable exploration by George Armstrong, around several old prospects along the Northeast Arm. Almaden Resources Corporation has drilled their King Bay Property which was optioned from Steep Rock Resources Incorporated. Mine Lake Minerals Incorporated continued their program of surface exploration north of Ouillette Lake in the Sturgeon Lake area. A number of older properties have changed hands and are undergoing evaluation by junior companies based on the Vancouver Stock Exchange. In the south, in the base metal area of Sturgeon Lake, Minnova Incorporated is conducting exploration programs on properties acquired from Seagull Oil and Gas. In the Wabigoon area, Camreco Incorporated is running a major exploration program on their Echo and Laval Township properties. Acadia Mineral Ventures Limited have acquired the Eimiller patents on Vermilion Lake and plan a drill program based on an extensive sampling program done in the summer of 1987. Moneta Porcupine Mines Incorporated continued geological and geochemical exploration on their properties near Vermilion Lake.

GEOLOGICAL DATA INVENTORY FOLIO PROGRAM

A number of Geological Data Information Folios (GDIFs) were published for the Division during 1987. The program is funded under the Canada Ontario Mineral Development Agreement. Each folio consists of a report, a property location map, and an explora-

TABLE 3.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM - AIRBORNE ELECTROMAGNETIC SURVEY
A MAG - AIRBORNE MAGNETOMETER SURVEY
ASSESS - ASSESSMENT WORK
BM - BASE METAL
CS - CORE SAMPLES
DD - DIAMOND DRILLING (numbers following "DD" indicate the number of holes drilled and total length drilled, respectively)

DDH - DIAMOND DRILL HOLES
EM - ELECTROMAGNETIC SURVEY
GEOCHEM - GEOCHEMICAL SURVEY
GEOPHYS - GEOPHYSICAL SURVEY
GL - GEOLOGICAL SURVEY
IP - INDUCED POLARIZATION SURVEY
MAG - MAGNETOMETER SURVEY
OMEP - ONTARIO MINERAL EXPLORATION PROGRAM

OVD - OVERBURDEN DRILLING
SA - SAMPLING, ASSAYS
STD - SOILS TEST DRILLING
STr - STRIPPING, SOIL TRENCHING
Tr - TRENCHING
VLF - VERY LOW FREQUENCY

ARS - ARSENIC
FU - FUCHSITE

GP - GRAPHITE
ARG - ARGILLITE
GN - GALENA
EP - EPIDOTE

SER - SERICITE
SP - SPHALERITE
TOUR- TOURMALINE
BIO- BIOTITE

MINERAL AND METAL SYMBOLS

AU - GOLD
AG - SILVER
CU - COPPER
ASP - ARSENOPYRITE
HEM - HEMATITE

PB - LEAD
ZN - ZINC
CP - CHALCOPYRITE
PY - PYRITE
PO - PYRRHOTITE
PY - PYRITE

MO - MOLYBDENITE
PO - PYRRHOTITE
MO - MOLYBDENUM
MAG - MAGNETITE
PB - LEAD
GT - GARNET

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ACHAPI LAKE	52P/04NE	PURE GOLD RES INC	ASP,HEM, PY,MAG, PO,CP	ASSESS	DD-8-1612.93m	1987	--	-0016
		INLET RESOURCES PURE GOLD RES INC	AU,CU,PB, (MULTI-ELEMENT)	ASSESS	GL, GEOCHEM	1987	2.10176	-0017
		DOME EXPL L	--	ASSESS	MAG, EM	1987	2.10341	-0018
		NORTHERN DYNASTY NEWFIELD MIN INC WESTFIELD MIN INC	CU,PB,ZN, AU(MULTI ELEMENT)	ASSESS	GEOCHEM	1987	2.10359	-0019
ARMIT LAKE	52J/07NW	UMEX INC	--	ASSESS	A MAG, AEM	1987	2.10355	-0019
ATIKOKIWAM LAKE	52P/04NW	PURE GOLD RES INC	MAG,PY,PO, CP,HEM,GT, SER	ASSESS	DD-7-4273.3'	1987	--	-0010
BECKINGTON LAKE	52J/02NE	ARMSTRONG, G BEST, A	AU,SP,PY PO,CP,MAG	ASSESS	DD-4-1413'	1987	--	-0061
		MINE LAKE MIN INC	--	ASSESS	STr	1987	--	-0062
		ARCHON MINERALS INC	--	ASSESS	STr	1987	--	-0063
CALEY LAKE	520/07SE	POWER EXPLORATION	TOUR,AU, MAG,PY, PO, ASP, CP	ASSESS	DD-16-4693'	1987	--	-0021
COUCHEEMOSKOG LAKE	520/08SE	SUNBURST EXPL L	PO,PY,CP, BIO,MAG	ASSESS	DD-8-2731'	1986	--	-0015
		POWER EXPLORATION	PY,PO,AU, MAG,SP, ASP,CP	ASSESS	DD-4-1036'	1987	--	-0016
		POWER EXPLORATION	AU,PY,PO, CP	ASSESS	DD-13-3643',SA	1987	--	-0017
		POWER EXPLORATION	PY,PO,CP, GP,ARG	ASSESS	DD-5-1843'	1987	--	-0018
DONA LAKE	520/08NE	DOME EXPLORATION (CANADA) LIMITED	MAG,PY,PO,	ASSESS	DD-1-586'	1985	--	-0061
		DOME EXPLORATION (CANADA) LIMITED	CP,PY,PO, AU	ASSESS	DD-29-14208'	1987	--	-0062
		DOME EXPLORATION (CANADA) LIMITED	AU,PY,PO, CP	ASSESS	DD-2-938'	1987	--	-0063
		DOME EXPLORATION (CANADA) LIMITED	AU,PY,PO, CP	ASSESS	DD-2-652'	1987	--	-0064
		CANADIAN CONTINENTAL OIL CORPORATION	PY,CP,PO, GN,HEM	ASSESS	GL,SA (MULTI ELEMENT), DD-5-859m	1987	2.10177 2.10304	-0065
		DOME EXPLORATION (CANADA) LIMITED	PY,PO,CP, MAG,AU	ASSESS	DD-30-11943',SA	1987	--	-0066
DRUM LAKE	520/03NE	NORANDA EXPL C L	--	ASSESS	GL	1987	2.10087	-0026
DUFFELL LAKE	520/02NW	NORANDA EXPL C L	PY,MAG,PO, CP	ASSESS	DD-11-4817'	1987	--	-0020
ERICHSEN LAKE	53B/15NE	ELDOR RESOURCES L	GT,PY,PO, MAG,CP	ASSESS	DD-5-1641'	1983	--	-0013
EVANS LAKE	52J/07SE	CUMBERLAND RES L	CU,PB,ZN, AG,AU,PY, CP,PO,SB GT	ASSESS	DD-2-519m	1986	--	-0076
		CUMBERLAND RES L	GT,EP,CU, PB,ZN,AG	ASSESS	DD-1-357.87', SA	1987	--	-0077

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
EVANS LAKE	52J/07SE	CUMBERLAND RES L	--	ASSESS	GL	1987	2.10233	-0078
		UMEX INC	--	ASSESS	A MAG, AEM	1987	2.10193	-0079
		CUMBERLAND RES L	CU,PB,ZN, AG,PY	ASSESS	DD-2-165.2m, SA	1987	--	-0080
FIRST LOON LAKE	52P/12SW	KERR ADDISON MS L	CU,ZN,PY, ASP,PO,CP, BIO,MAG, GT	ASSESS	DD-10-3212'	1986	--	-0027
		POWER EXPL INC	PY,AU,MAG, PO	ASSESS	DD-1-377'	1987	--	-0028
		POWER EXPL INC	AU,PY,PO, CP	ASSESS	DD-46-18465'	1987	--	-0029
		POWER EXPL INC	AU,PY,PO, CP,MAG,GF HEM,TOUR, ANK,ASP GRUNERITE	ASSESS	DD-42-12546'	1987	--	-0031
		UMEX INC	PY,PO,ARS MAG,CP,AU	ASSESS	DD-7-3784.30	1987	--	-0032
		UMEX INC	--	ASSESS	MAG, EM	1987	2.10194	-0033
		POWER EXPL INC	--	ASSESS	DD-61-23887', SA	1987	--	-0030
FOURBAY LAKE	52J/02SW	STEEP ROCK RES INC	--	ASSESS	STr	1985	--	-0079
FRY LAKE	52O/03NW	UMEX INC	PY,PO,CP	ASSESS	DD-3-688.11m	1987	--	-0031
		SHERRITT GORDON MS L	PY,PO,CP, AU,ZN	ASSESS	DD-11-5767'	1987	--	-0032
		UMEX INC	--	ASSESS	DD-1-46.65m (abandoned hole)	1987	--	-0033
		UMEX INC	PY,PO,CP, SP,GF,mo	ASSESS	DD-2-203.66m	1987	--	-0034
JOHNSTON BAY	52O/03SE	KERR ADDISON MS L	AU,PO,PY, CP,AG,CU, ZN,ASP	ASSESS	DD-13-4152'	1987	--	-0016
KABIK LAKE AND PICKEREL TOWNSHIP	52F/16NE	MCCOMBE, ROBERT J	--	ASSESS	Tr	1970	--	-0043
KAWASHE LAKE	52O/06SE	ST. JOE (CANADA) L	AU,PO,PY, CP,SP,MAG	ASSESS	DD-4-1229m	1987	--	-0029
		NORANDA EXPL C L	PY,CP,AU, MAG	ASSESS	DD-4-320.0m	1987	--	-0030
		ST. JOE (CANADA) L	AU,PO,PY, CP	ASSESS	DD-5-696m	1987	--	-0031
		DOME EXPLORATION (CANADA) LIMITED	PY,PO,CP, ASP,MAG, AU	ASSESS	DD-11-4698'	1987	--	-0032
		POWER EXPL INC	PY,PO,CP, mo,AU,MAG	ASSESS	DD-36-11315', SA	1987	--	-0033
		POWER EXPL INC	PY,PO,CP, AU,MAG, HEM,SP, GRENERITE	ASSESS	DD-61-23887'	1987	--	-0034
		ATEBA MINES INC	PY,PO,MAG	ASSESS	DD-5-2505'	1987	--	-0035
KEEYASK LAKE (AGUTUA ARM)	53B/14NE	ORACLE RES L	AU,AG,CP, PY,PO	ASSESS	DD-14-3761'	1986/87	--	-0015
		ORACLE RES L	PY,PO,CP, GRUNERITE, SP,GN	ASSESS	DD-1-149.05m	1987	--	-0016
LITTLE OCHIG LAKE	52O/08SW	POWER EXPL INC	AU,PY,MAG, PO,GN,TOUR, CP	ASSESS	DD-39-12424'	1986/87	--	-0015
		GOLDEN TERRACE RESOURCES CORP	PY,PO,CP, AU	ASSESS	DD-11-6167', SA	1986	--	-0016
MATAPESATAKUN BAY	52O/02NE	GOLDEN TERRACE RESOURCES CORP	AU,PY,PO, ASP	ASSESS	DD-4-4259'	1986	--	-0013

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
MCVICAR LAKE	520/11SW	COMINCO L	--	ASSESS	A MAG, AEM	1987	2.10084	-0043
		LOCATOR EXPL	--	ASSESS	A MAG, AEM	1987	2.10101	-0044
		DURATION MS L	PY,PO,CP, CU,ASP	ASSESS	DD-1-406.8'	1987	--	-0045
		UTAH MINES L	PY,PO,CP, CU,ASP	ASSESS	DD-9-2526'	1987	--	-0046
		UTAH MINES L	PY,PO,CP	ASSESS	DD-4-1048'	1987	--	-0047
		DURATION MINES L WILSHIRE ENERGY RESOURCES INC	AU,AG,PY, MAG,PO	ASSESS	MAG, EM,GL,SA	1987	2.9565	-0048
		LOCATOR EXPL	PY,CP	ASSESS	DD-3-1780.9	1987	--	-0049
		DURATION MINES L	PY,PO,MAG, CP	ASSESS	DD-8-3233.6'	1987	--	-0050
		UTAH MINES L	PY,PO,CP	ASSESS	DD-9-2070'	1987	--	-0051
MEEN LAKE	520/06NW	UMEX INC	PY,PO,CP, mo,TOUR, FU	ASSESS	DD-5-2053.02'	1986	--	-0015
		DURATION MINES L WILSHIRE ENERGY RESOURCES INC	PY,MAG,PO, CP	ASSESS	DD-2-360m	1986	--	-0016
		POWER EXPL INC	AU,PY,PO, CP	ASSESS	DD-14-3738',SA	1986	--	-0017
MANGO LAKE	53B/06NW	DOME EXPLORATION (CANADA) LIMITED	AU,MAG,PY, PO,ASP,SP, CP	ASSESS	DD-3-1908',SA	1987	--	-0014
PARNES LAKE	52G/13NW 52G/16NE	GOLDEN RANGE RES INC	--	ASSESS	MAG,EM	1984	--	-0033
RANDALL LAKE	53B/14SE	NORTHERN DYNASTY EXPLORATION L	PY,PO,CP, HEM	ASSESS	DD-1-262.4'	1987	--	-0019
SAVANT LAKE	52J/09SW	HBOG MINING L	--	ASSESS	Tr	1973	--	-0029
SKINNER LAKE	53B/09NW	ORACLE RESOURCES L	PY,PO,AU MAG,CP	ASSESS	DD-30-10467'	1986/87	--	-0026
		ORACLE RESOURCES L	--	ASSESS	MAG, EM	1987	--	-0027
SQUAW LAKE	52J/02SE	BENDERITE, ADAM	--	ASSESS	STr	1986	--	-0073
		MISTANGO CONSOLIDATED RESOURCES L	PY,PO,CP	ASSESS	DD-3-974'	1987	--	-0074
TARP LAKE	520/09SE	ESSO RESOURCES (CANADA) L	PY,MAG,PO	ASSESS	DD-1-169m	1986	--	-0055
		DOME EXPLORATION (CANADA) L	PY,PO,CP, HEM,AU	ASSESS	DD-15-6890'	1987	--	-0056
		VAN HORNE GOLD MARIETTA RES CORP ORACLE RESOURCES	PY,ASP,AU, CP,PO,MAG	ASSESS	DD-4-1103'	1987	--	-0057
VERMILION TOWNSHIP	52K/01SE	MONETA PORCUPINE MINES INC	PY,PO,MAG	ASSESS	DD-1-623'	1987	--	-0024
WEBB TOWNSHIP	52F/16NW	ALBERT, VICTOR	--	ASSESS	MANUAL WORK	1971	--	-0068
WESLEYAN LAKE	520/04NE	CANLORM RES INC	--	ASSESS	MAG, EM	1987	--	-0024
WRIGHT LAKE	520/07SW	NORTHERN DYNASTY EXPLORATION L	PY,PO,AU, MAG	ASSESS	DD-10-4502'	1987	--	-0017
		NORTHERN DYNASTY EXPLORATION L	--	ASSESS	ABANDONED HOLE	1987	--	-0018
ZEEMEL LAKE	53B/09SW	DOME EXPLORATION (CANADA) LIMITED	PO,MAG,GT, PY,ASP,AU, CP	ASSESS	DD-14-2635.1m	1986	--	-0037

TABLE 3.4. OMEP PROGRAMS IN THE PATRICIA MINING DIVISION DESIGNATED AFTER DECEMBER 1, 1986.

Location	Total Expenditures	OMEP Assistance
Armit L	$ 135,000.00	$ 33,750
Beckington L	342,650.00	85,663
Connell Tp	263,900.00	65,975
Dona L	274,600.00	68,650
Drayton Tp	117,000.00	29,250
First Loon L	591,000.00	134,531
Forester L	145,200.00	36,300
Fourbay L	75,000.00	18,750
Fry L	286,375.00	71,594
Kabik L	14,500.00	3,625
Kawashe L	1,056,100.00	240,378
Keeyask L	954,275.00	128,834
Meen L	342,621.00	85,655
Nemeigusabins L	800,000.00	200,000
Poisson Tp	66,370.00	16,593
Seeseep L	471,250.00	117,813
Sharron L	21,400.00	5,350
Stoughton L	497,500.00	123,438
Vermilion Tp	297,250.00	74,313
Wesleyan L	200,000.00	50,000
Wright L	377,300.00	94,325
Zeemel L	14,110,550.00	331,750
TOTAL	$21,439,841.00	$2,016,537

TABLE 3.5

LIST OF COMPLETED GEOLOGICAL DATA INVENTORY FOLIOS

AREA NAME	NTS AREA	GDIF NO.
ACHAPI LAKE	52P/04NE	212
ATIKOKIWAM LAKE	52P/04NW	211
AUGUST LAKE	52P/04SE	216
BECKINGTON LAKE	52J/02NE	355
BELL LAKE	52G/15SW	IN PRESS
CALEY LAKE	520/07SE	326
CARON LAKE	520/01SE	214
COLLISHAW LAKE	52P/12NW	IN PRESS
COUCHEEMOSKOG LAKE	520/08SE	276
DONA LAKE	520/08NE	279
DRUM LAKE	520/03NE	337
DUFFELL LAKE	520/02NW	338
ECHO TP	52F/16SW	318
FIRST LOON LAKE	52P/12SW	IN PRESS
FOURBAY LAKE	52J/02SW	348
FRY LAKE	520/03NW	373
GREENBUSH LAKE	52J/16NE	218
JOHNSTON BAY	520/03SE	374
KAPKICHI LAKE	520/08NW	277
KAWASHE LAKE	520/06SE	324
LITTLE OCHIG LAKE	520/08SW	278
LOWRY LAKE	52P/04SW	215
MATAPESATAKUN BAY	520/02NE	339
MCAREE TP	52F/16SW	219
NABEMAKOSEKA LAKE	520/06SW	372
OSNABURGH LAKE	520/01NE	210
PASHKOKOGAN LAKE	52J/16NW	217
PONSFORD LAKE	520/09SW	274
QUEST LAKE	52G/15NE	384
RIACH LAKE	520/01SW	213
SIXMILE LAKE	52G/15NW	328
SMOCK LAKE	52G/13NE	319
SQUAW LAKE	52J/02SE	327
TARP LAKE	520/09SE	275
VALORA LAKE	52G/14SE	IN PRESS
WRIGHT LAKE	520/07SW	325

tion map. Each report contains information for a National Topographic System (NTS) or claim map area and includes mineral occurrences, type of work, diamond drilling, airborne surveys, geochemical surveys, newspaper clippings, ODM Index, aerial photos and remote sensing, and selected references. The exploration map shows all drilling, geophysical work, geochemical work, trenching and stripping, and mineral occurrences on record for the area. From May of 1987 to present, six GDIFs have been published for the Patricia Mining Division; four additional folios are in press. The GDIFs completed this year have been concentrated in the central Uchi Belt, and the Pickle Lake and Sturgeon Lake areas.

During 1987, a period of time was spent utilizing a computer to produce GDIFs on a trial basis. The aim is to maintain and update folios on the computer at the Resident Geologist's Office, and to print updates on demand. The computer program was produced by J. Donald of the Sault Ste. Marie Resident Geologist's Office.

For the remainder of 1987, emphasis will be on completing coverage of the Uchi Belt. Future concentration will be on folios for the North Caribou Belt and Opapimiskan Lake Areas.

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4. Thunder Bay Resident Geologist's Area—1987

G.C. Patterson[1], G. White[2], P. Sarvas[3], and P. Perry[4]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[2]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[3]Staff Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[4]Data Folio Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

INTRODUCTION

The boundaries of the Thunder Bay Resident Geologist's area were realigned in 1987: the Resident Geologist is now responsible for an area from Nipigon, west to Atikokan, and north to Armstrong (Figure 4.1a,b); the Schreiber-Hemlo district covers Nipigon, east to White River, and north to Manitouwadge; and the Beardmore-Geraldton district consists of the area from Beardmore, to east of Longlac, and north to the Hudson Bay Lowlands. Information on the Schreiber-Hemlo and Beardmore-Geraldton districts is presented in separate reports in this volume. The Thunder Bay Drill Core Library service covers all three districts.

ACKNOWLEDGMENTS

During the spring of 1987, the exploration activity in the Shebandowan district was monitored by J.F. Scott (Project Geologist, Ministry of Northern Development and Mines, Northwestern Region). During the period from March to April, 1987, R. Dutka provided the Resident with an orientation of the Atikokan area. R. Rantola served as the Resident Geologist's assistant during the summer. Currently, P. Sarvas is assisting the Thunder Bay Resident Geologist.

The Drill Core Library is staffed by G. White, Drill Core Library Geologist, and P. Hinz, Assistant Drill Core Library Geologist. The section on the Drill Core Library's activities was written by G. White and P. Hinz, edited by P. Perry, and typed by L. Hutchings.

RESIDENT GEOLOGIST AND STAFF ACTIVITIES

Much of the Resident Geologist's, and staff, time was involved in assisting geologists, prospectors, explorationists, government groups, and the general public with enquiries on the geology of the district. Several field trips were led in the Atikokan district.

Approximately 25, seven-minute radio interviews were given to the Canadian Broadcasting Corporation radio station CBLQ, for the program Radio Noon Northwest. These interviews covered a wide range of mining–geology related topics including general exploration, history, geological exploration techniques, and natural history.

Three slide shows (Amethyst, The Hemlo Story, and Exploration Bin North West Ontario) were produced under a Canada–Ontario Unemployment Insurance Section 38 Job Creation Program, sponsored by the Canadian Institute of Mining and Metallurgy (Thunder Bay district). "The Hemlo Story" was converted to video tape.

A portion of the summer was spent preparing a field trip guide of the Atikokan area. Trenches on seven properties were mapped. Part of the winter of 1988 will be spent updating mineral deposit files.

The Resident Geologist contributed two papers to the Ministry of Northern Development and Mines' publication "PLATINUM IN ONTARIO", which is in press. Two displays and a talk were presented at the Thunder Bay Geoscience Seminar.

A prospector course, jointly sponsored by the Ministry of Northern Development and Mines and the Atikokan Development Office, was given in Atikokan. The course consisted of 5 two-hour lectures and a one-day field demonstration.

MINING ACTIVITIES

The INCO Limited Shebandowan Mine has been under care and maintenance for all of 1987. On the Tandem Resources-Storimin Exploration Property at Snodgrass Lake, a decline is planned to 400 feet with levels at 200 and 400 feet. A bulk sample will be taken as part of a feasibility study. Madeleine Mines Limited continues with development work (mill and road construction) on their Lac des Iles Property.

Five amethyst mines were in production this year: Thunder Bay Amethyst Mine Panorama, Diamond Willow, Pearl Lake, Dorion Amethyst Mine, and the Ontario Gem Property. The Thunder Bay Amethyst Mine has started producing a relatively large quantity of faceted stones. The Ontario Gem Property continues to produce a smaller amount of faceted material.

CLAIM STAKING AND EXPLORATION

Most of the Atikokan and Shebandowan Greenstone Belts have been staked. In the Atikokan area, much of the Marmion Lake Batholith has also been staked. Within the Marmion Lake Batholith, several past gold producers and new showings have received attention. In the Shebandowan Belt, the activity is focused on the Moss Township area near the Tandem Resources–Storimin Exploration Property.

All of the larger mafic to ultramafic intrusions have been staked and are being explored for platinum group metals. Only two properties in the Lumby Lake area and Burchell Lake area are being examined for their base-metal potential. Two new amethyst showings have been staked. A barite property near the Town of Stanley was drilled.

See Table 4.1 for a summary of assessment and other information received and Table 4.2 for a summary of claims recorded and assessment work credit. Note that all properties described in the text are listed in Table 4.3 and keyed to Figure 4.1.

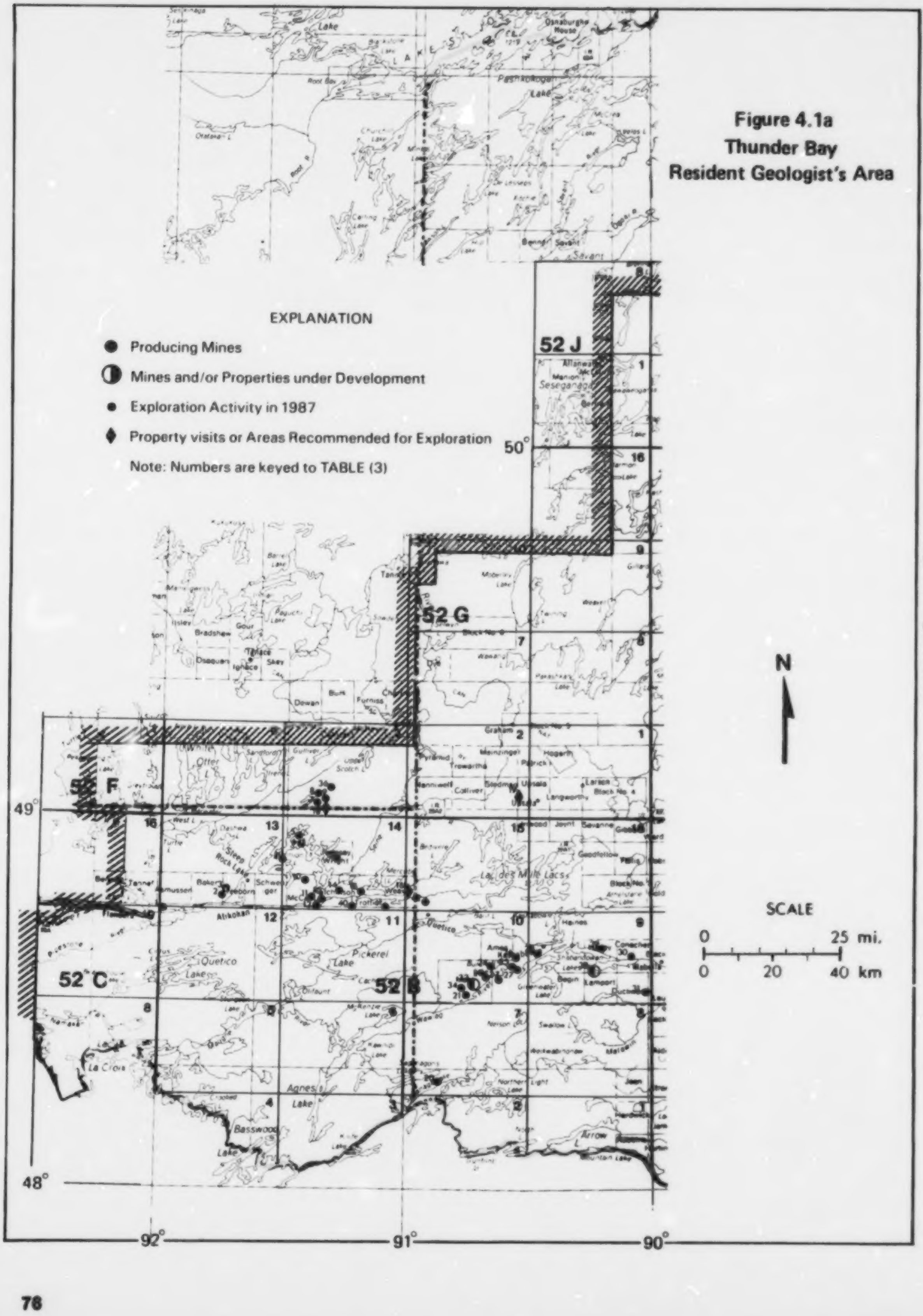

Figure 4.1a
Thunder Bay
Resident Geologist's Area

EXPLANATION
● Producing Mines
◐ Mines and/or Properties under Development
• Exploration Activity in 1987
◆ Property visits or Areas Recommended for Exploration
Note: Numbers are keyed to TABLE (3)
52 J
52 G
52 F
52 C
52 B
50°
49°
48°
92°
91°
90°
N
SCALE
0 25 mi.
0 20 40 km
Adjoins Figure 4.1b
Savant
Sesegana
Quetico Lake
Pickerel Lake
Agnes Lake
Basswood Lake
Lac des Mille Lacs
Sleep Rock Lake
Otter L
Arrow L
La Croix
Atikokan
Upsala

Adjoins Figure 4.1a

Figure 4.1b
Thunder Bay
Resident Geologist's Area

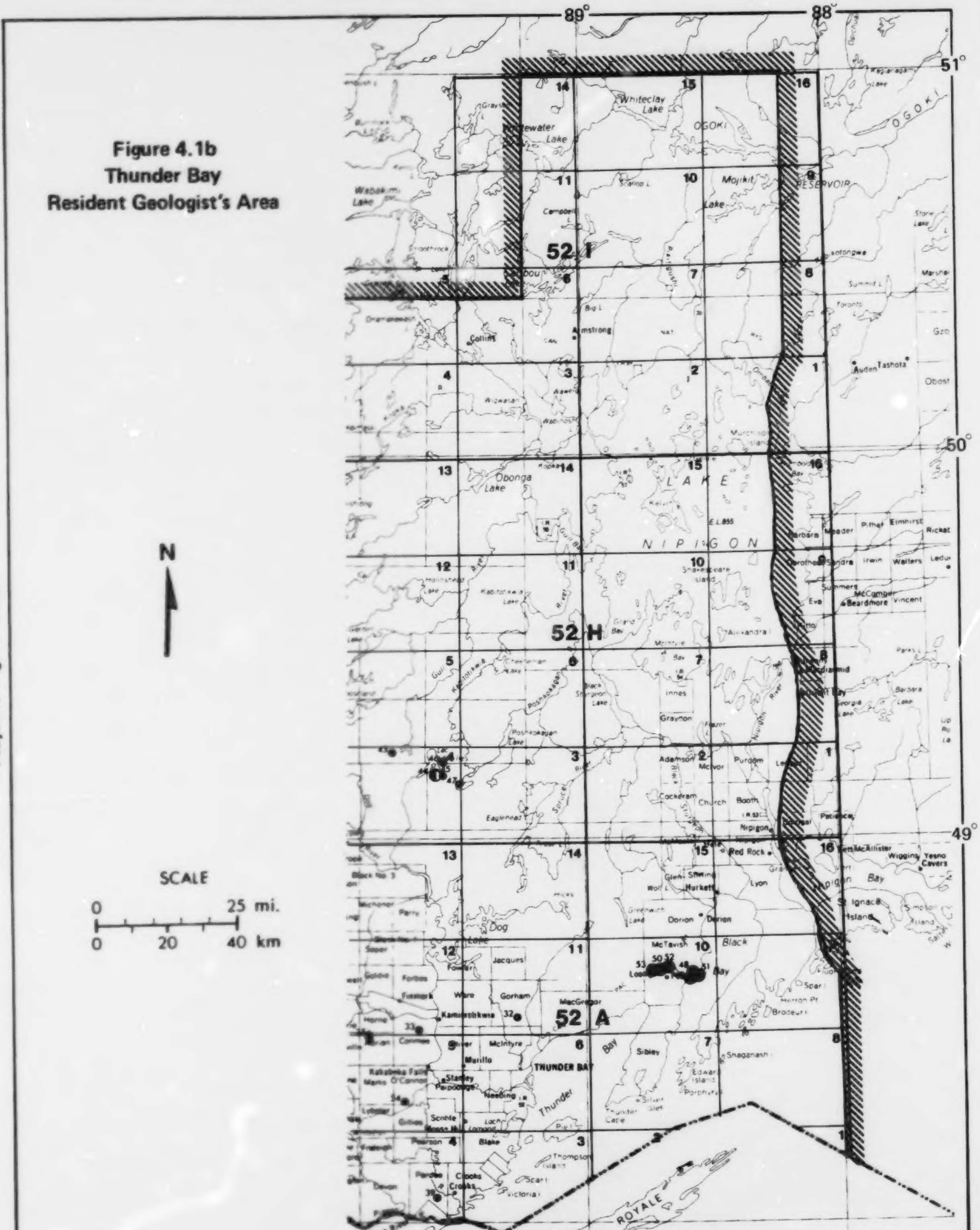
89°
88°
51°
50°
49°
52 I
52 H
52 A
N
SCALE
0 25 mi.
0 20 40 km
Whiteclay Lake
Whitewater Lake
OGOKI
Mojikit Lake
RESERVOIR
Armstrong
Collins
Auden
Tashota
Obonga Lake
LAKE NIPIGON
Beardmore
Nipigon
Red Rock
Nipigon Bay
Dorion
Black Bay
Kaministikwia
THUNDER BAY
Thunder Bay
Sibley
Pigeon River
ISLE ROYALE

TABLE 4.1 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

A-Airborne Survey
AEM-Airborne Electromagnetic Survey
A Mag-Airborne Magnetometer Survey
Assess-Assessment Work
Non Assess-Non-Assessment Work
DD-Diamond Drilling (where shown the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively)
DCD-Drill Core Donation
DR-Drilling Report
EM-Electromagnetic Survey
Geochem-Geochemical Survey
Grad-Gradiometric Survey

GL-Geological Survey
HLEM-Horizontal Loop Electromagnetic Survey
IP-Induced Polarization
Mag-Magnetometer Survey
Man Work-Manual Work
Met-Metallurgical Studies
Mech Work-Mechanical Work
OMEP-Ontario Mineral Exploration Program
Photo-Photogrammetric Survey
PR-Property Report
Rad-Radiometric Survey
Res-Resistivity Survey
(r)-Rock
(S)-Soil
SA-Sampling, Assays

STr-Power Stripping
Tr-Trenching
VLF-Very Low Frequency

Ag-Silver
Amy-Amethyst
Au-Gold
PGE-Platinum Group Elements
W-Tungsten

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lac Des Iles (G-739), Shelby Lake (G-2512)	52H4/NE/SE	1a. American Platinum Inc. (Spence, I.) (Middaugh, R.)	PGE	Assess	AEM, A Mag	1986	2.9706	
Lac Des Iles (G-739)	52H4/NE	1b. American Platinum Inc. (Angle Bay Property) (Middaugh, R.)	PGE	Assess	Grad, GL, Mag, SA	1986	2.9794	
Moss Twp. (G-676)	52B10/SW	2. Ardeen Mine (Huronian Mines) (Belore Mines)	Au	OMEP	Mag	1984	63.4632	
Norway Lake (G-345)	52G3/SW	3. Billiton Canada Ltd. (Red Paint Lake Property)	Au	OMEP	Geochem, SA, GL	1984	63.4528	
McCaul Twp./Sanawi Lake (G-554)	52B14/SW	4. 153028 Canada Inc. (Wicheruk, Michael)	Au	Assess	STr, Man Work, Mech Work	1987	-	
Conacher Twp. (G-646)	52B9/SE	5a. Canadian Nickel Co. Ltd. (INCO)	Au	Assess	SA	1983	2.9852	
Henderson Lake (G-730), Boot Bay (G-2709)	52B16/SW, 52B15/SE	5b. Canadian Nickel Co. Ltd. (Bolton Bay Project)	Au	Assess	Rad, GL, VLF, Mag	1986	2.9455	
Ramsay-Wright Twp. (G-573)	52B14/NW	5c. Canadian Nickel Co. Ltd. (INCO) (Pettigrew Project)	Au	Assess	DD 2-187.8 m, SA	1987	-	
Max Lake (G-741)	52H3/NW	6a. Canamax Resources Inc. (Max Lake Project)	Au	Assess	Man Work, Mech Work, SA	1983, 1984	2.9506	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Max Lake (G-741)	52H3/NW	6b. Canamax Resources Inc. (Max Lake Project)	Au	Assess	DD 2-79.25 m	1987	-	
Max Lake (G-741)	52H3/NW	6c. Canamax Resources Inc.	Au	Non-Assess	DCD	1987	-	
McTavish Twp. (G-675)	52A10/NE	7. Castagne, Alphonse A.	Amy	Assess	Man Work, Mech Work	1986	-	
Freeborn Twp. (G-570)	52B13/SE	8a. Chapman, S. F.	Au	Assess	DD 3-155.8 m, SA	1986	-	
Hutchinson Twp. (G-571), McCaul Twp./ Sabawi Lake (G-554), Freeborn Twp. (G-570)	52B14/SW, 52B13/SE	8b. Chapman, S. F. (Mammoth Claims) (Freeborn Property)	Au	Assess	AEM, VLF, A Mag	1987	2.10098	
McCaul Twp./Sabawi Lake (G-554), Hutchinson Twp. (G-571), Freeborn Twp. (G-570)	52B14/SW, 52B13/SE	8c. Chapman, S. F. (Mammoth Prop.) (Freeborn Property)	Au	Assess	SA	1986	2.9853	
Wild Potatoe Lake (G-565)	52C9/NW	9a. Ciglen, Samuel (Wild Potatoe Lake Claims)	Au	Assess	AEM, VLF, A Mag	1986	2.9524	
Wild Potatoe Lake (G-565)	52C9/NW	9b. Ciglen, Samuel (Wild Potatoe Lake Property) (Log Cabin Mine)	Au	Assess	GL, SA	1986	2.9525	
Bedivere Lake (G-511)	52B15/SW	10a. Coventry Ventures Inc. (Sears, Seymour) (Bedivere Lake Platinum Prospect)	PGE	Assess	Geochem (r)/(S), SA, GL	1986	2.9399	
Bedivere Lake (G-511)	52B15/SW	10b. Coventry Ventures Inc. (Byres, K. L. J.) (Sears, S.) (Ekstrom, R.) (Bedivere Lake Platinum Project)	PGE	Assess	EM, Mag	1986	2.9462	
Bedivere Lake (G-511)	52B15/SW	10c. Coventry Ventures Inc. (Bedivere Lake Platinum Project)	PGE	Assess	Geochem (r)/(S), SA, GL, IP, Res, HLEM, Mag	1986	2.990	
Lac Des Iles (G-739)	52H4/NE	11a. Cream Silver Mines Ltd. (Lac Des Iles Property)	PGE	Assess	Mech Work, DD 1-123.8 m, SA	1986, 1987	-	
Lac Des Iles (G-739)	52H4/NE	11b. Cream Silver Mines Ltd. (Lac Des Iles Project)	PGE	Assess	Grad, Mag	1987	2.10034	
Lac Des Iles (G-739)	52H4/NE	11c. Cream Silver Mines Ltd. (Lac Des Iles Property)	PGE	Assess	Tr, GL	1987	2.10056	
McTavish Twp. (G-675)	52A10/NE	12. Dowhos, Doug	Au	Assess	STr	1986	-	
Burchell Lake (G-706)	52B10/SE	13. E.L.E. Energy Inc. (Ternowesky, J.) (Belisle, O.)	Au	Assess	AEM, VLF, A Mag	1987	2.10251	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lac Des Iles (G-739)	52H4/NE	14. Equinox Resources Ltd. (Culbert, Richard R.)	PGE	Assess	AEM, A Mag	1986	2.9993	
Sawbill Bay/Marmion Lake (G-558)	52B14/NW	15a. Falconbridge Nickel Mines Ltd. (Hammond Reef Project)	Au	Assess	DD 1-168.25 m	1987	-	
Sawbill Bay/Marmion Lake (G-558)	52B14/NW	15b. Falconbridge Nickel Mines Ltd. (Hammond Reef Project)	Au	Assess	DD 2-396.63 m	1987	-	
Sawbill Bay/Marmion Lake (G-558)	52B14/NW	15c. Falconbridge Nickel Mines Ltd. (Hammond Reef Project)	Au	Assess	DD 1-209 m	1987	-	
Finlayson Lake (G-528), Freeborn Twp. (G-570)	52B13/NE/SE	16a. Fern Elizabeth Gold Explor. Ltd.	Au	OMEP	Tr	1986	63.4378	
Freeborn Twp. (G-570)	52B13/SE	16b. Fern Elizabeth Gold Explor. Ltd. (Moffatt, R.)	Au	Assess	STr	1986	-	
Freeborn Twp. (G-570)	52B13/SE	16c. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Man Work, Mech Work, DD 11-1462.5 m, SA	1986, 1987	-	
Hutchinson Twp. (G-571)	52B14/SW	16d. Fern Elizabeth Gold Explor. Ltd.	Au	OMEP	Tr	1983	63.4378	
McCaul Twp./Sabawe Lake (G-574)	52B14/SW	16e. Fern Elizabeth Gold Explor. Ltd.	Au	OMEP	Tr	1983	63.4378	
Conacher Twp. (G-646)	52B9/NE	17a. CLE Resources Ltd. (Lincoln Resources Inc.)	Au	Assess	DD 1-193.85 m	1986	-	
Haines Twp. (G-662)	52B9/NW	17b. CLE Resources Ltd. (Lincoln Resources Inc.) (Ray Smith Prospect)	Au	OMEP	DR, SA, DD 14-979.62 m	1983 1984	63.4567	
Dawson Road Lots (G-649)	52A12/SW	18. Godzik, Alex	Au	Assess	Man Work	1987	-	
Powell Lake (G-549)	52B7/NW	19. Gracey, K. A.	Au	Assess	Mech Work	1986	-	
Moss Twp. (G-676), Powell Lake (G-549)	52B10SW, 52B7/NW	20a. Grand Portage Resources Ltd.	Au	Assess	STr	1987	-	
Powell Lake (G-549)	52B7/NW	20b. Grand Portage Resources Ltd. (Gracey, K. A.)	Au	Assess	Tr, PR, SA	1986	2.9890	
MacGregor Twp. (G-672)	52A10/SW	21. Grieve, Michael D.	Amy	Assess	Man Work, Mech Work	1987	-	
Powell Lake (G-549)	52B7/NW	22. Gunflint Resources Ltd.	Au	Assess	Mech Work, GL, Geochem (r), IP, VLF, Mag, SA	1986	2.9946	
Moss Twp. (G-676)	52B10/SW	23a. Huronian Mines Ltd. (Matt Berry Mines Ltd.)(Ardeen South Prop.)	Au	Assess	Photo	1987	2.9954	
Moss Twp. (G-676)	52B10/SW	23b. Huronian Mines Ltd. (Matt Berry Mines Ltd.)(Ardeen South Prop.)	Au	Assess	DD 9-1265.6 m	1987	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McCaul Twp./Sabawi Lake (G-554)	52B14/SW	24. Ican Resources Ltd. (Jack Lake Gold Prospect)	Au	OMEP	DR, SA, DD 11-748.3 m	1984	63.4557	
Weaver Twp. (G-576), Crooked Pine Lake (G-519), Bedivere Lake (G-511), Brule Lake (G-513), Eva Lake (G-526)	52B14/SE, 52B15/SW, 52B10/NW, 52B11/NE	25. Imperial Platinum Corp. (Bedivere Lake Property)	PGE	Assess	VLF, Mag	1987	2.10142	
Duckworth Twp. (G-638)	52B9/SE	26. Jalna Resources Ltd.	Au	OMEP	DR	1985	63.4618	
Hutchinson Twp. (G-571)	52B14/SW	27. Kenergy Resources Corp. (Anjamin Mines Prop.)	Au	OMEP	Geochem, SA, GL, IP, Mag	1984	63.4532	
Gillies Twp. (G-687), O'Connor Twp. (G-678)	52A5/SE	28. Keystone (Climax) Mine (Johnson, E.)	Ag	OMEP	SA	1985	63.4574	
Steeprock Lake (G-560)	52B13/SE	29a. Klug, F. (Wicheruk, M.) (Big Six Prop.)	Au	OMEP	PR	1985	63.4538	
Steeprock Lake (G-560)	52B13/SE	29b. Klug, F. (Wicheruk, M.) (Big Six Mine)	Au	Assess	SA	1985	2.9600	
Puddy Lake (G-118)	52H13/NE	30. Kuhner, Knut	PGE	Assess	STr	1986	-	
Adrian Twp. (G-640)	52A5/NW	31a. Kukkee, Edwin	Au	Assess	Mech Work	1985	-	
Adrian Twp. (G-640)	52A5/NW	31b. Kukkee, Edwin	Au	Assess	Man Work	1986	-	
Adrian Twp. (G-640)	52A5/NW	31c. Kukkee, Edwin	Au	Assess	SA	1986	2.9727	
Hutchinson Twp. (G-571)	52B14/SW	32. Labrador Mining & Explor. Co. Ltd.	Au	Non-Assess	DR, GL/Geochem Report only	1985	-	
McTavish Twp. (G-675)	52A10/NE	33. Lukinuk, Steven W.	Amy	Assess	STr	1986	-	
Burchell Lake (G-706)	52B10/SE	34. MacLeod, J. W. (Tenajon Silver Corp.) (Suneva Resources Ltd.)	Au	OMEP	PR	1983	63.4516	
Gorham Twp. (G-660)	52A11/NW	35. Maki, Mark	Au	Assess	STr	1987	-	
Hagey Twp. (G-661)	52B9/SE	36. Mattagami Lake Explor. Co. Ltd. (Band-Ore Extension Property)	Au	Assess	STr, DD 1-104 m	1986	-	
O'Connor Twp. (G-678)	52A5/SE/SW	37. Mill Rock Resources Inc.	Au	Assess	Man Work, STr	1987	-	
Weaver Twp. (G-576)	52B14/SE	38a. Morehouse, W. D.	W, PGE	Assess	STr	1987	-	
Weaver Twp. (G-576)	52B14/SE	38b. Morehouse, W. D.	W, PGE	Assess	SA	1987	2.10379	
Moss Twp. (G-676)	52B10/SE/SW	39. Myslicki, Margaret Ann	Au	Assess	STr	1987	-	
Burchell Lake (G-706), Moss Twp. (G-676)	52B10/SE	40. Newmont Explor. of Can. Ltd. (Newmont Mines Ltd.) (Burchell Lake Project)	Au	Assess	VLF, Mag	1987	2.10013	
Begin Twp. (G-643)	52B9/SW	41a. Noranda Explor. Co. Ltd. (Horseshoe Lake Project)	Au	Assess	SA	1987	2.10300	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Burchell Lake (G-706)	52B10/SE	41b. Noranda Exploration Co. Ltd. (Hicks Option)	Au	Assess	DD 4-370.8 m	1986	-	
Burchell Lake (G-706)	52B10/SE	41c. Noranda Exploration Co. Ltd. (Hicks Option)	Au	Assess	STr, Man Work	1986	-	
Burchell Lake (G-706)	52B10/SE	41d. Noranda Exploration Co. Ltd. (Hicks Option)	Au	Assess	Tr, SA	1986	2.9898	
Burchell Lake (G-706)	52B10/SE	41e. Noranda Exploration Co. Ltd. (Hicks Option) (Thow, Roger)	Au	Assess	Res, IP	1986	2.9935	
Conmee Twp. (G-647)	52A12/SE	41f. Noranda Exploration Co. Ltd. (Stewart Option)	Au	Assess	SA	1986	2.9897	
Conmee Twp. (G-647)	52A12/SE	41g. Noranda Exploration Co. Ltd. (Stewart Option)	Au	Assess	STr	1986	-	
Conmee Twp. (G-647)	52A12/SE	41h. Noranda Exploration Co. Ltd. (Stewart Option)	Au	Assess	DD 8-1176 m	1986	-	
Duckworth Twp. (G-[illegible])	52B9/SE	41i. Noranda Exploration Co. Ltd.	Au	Assess	SA	1987	2.10221	
Greenwater Lake (G-2713), [illegible] Twp. (G-[illegible])	52B9/SW	41j. Noranda Exploration Co. Ltd.	Au	Assess	GL, EM, Mag	1986	2.9548	
Armistice Lake (G-594), Tib Lake (G-2660)	52H3/SW, 52H4/NW	42. Park Avenue Resources (Lassila, P.)	PGE	OMEP	PR, SA	1984, 1985	63.4527	
Moravian Twp. (G-679)	52A10/NE	43. Pearl Lake Amethyst Mines Inc.	Amy	Assess	STr	1986	-	
Lac Des Iles (G-739)	52H4/NE	44a. Platinum Explor. Can. Inc. (Wawiag Resources Option) (Ternowesky Option)	PGE	Assess	Grad, VLF, Mag	1987	2.9981	
Lucky Lake (G-[illegible])	52H2/SW	44b. Platinum Explor. Can. Inc. (Seagull Lake Claims)	PGE	Assess	GL, VLF, Mag, SA	1987	2.10216	
Senga Lake (G-758), Shelby Lake (G-2512)	52H4/SW/SE	44c. Platinum Explor. Can. Inc. (Demars Lake Option)	PGE	Assess	VLF, Mag, Grad	1987	2.10089	
Tib Lake (G-2660)	52H4/NW	44d. Platinum Explor. Can. Inc. (Dog River Property)	PGE	Assess	Mag	1986	2.9982	
Tib Lake (G-2660)	52H4/NW	44e. Platinum Explor. Can. Inc. (Spence, I.) (Glover, P.) (Dog River Property)	PGE	Assess	VLF	1986	2.10147	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Crooked Pine Lake (G-519)	52B14/SE	45. St. Joe Canada Inc. (Kawene Property)	PGE	Assess	IP, Mag	1987	2.10025	
Burchell Lake (G-706)	52B10/SE	46a. Sanders, T.	Au	Assess	SA	1985	2.9493	
Burchell Lake (G-706)	52B10/SE	46b. Sanders, T.	Au	Assess	SA	1985	2.9536	
Burchell Lake (G-706)	52B10/SE	46c. Sanders, T.	Au	Assess	GL	1986	2.9571	
Burchell Lake (G-706)	52B10/SE	46d. Sanders, T.	Au	Assess	VLF	1986	2.9788	
Burchell Lake (G-706)	52B10/SE	46e. Sanders, T. (Lukosius-Sanders, J.) (Burchell Lake Property)	Au	Assess	Rad, Mag	1987	2.10338	
Lac Des Iles (G-739)	52H4/NE	47. Sawdo, Robert (Lac Des Iles Area Property)	PGE	Assess	EM, Mag	1987	2.9956	
Wild Potatoe Lake (G-565)	52C9/NW	48. Seine River Resources Inc. (Bell, A. M.) (Group #1 Property)	Au	Assess	GL	1987	2.10299	
Orbit Lake (G-748)	52A13/NW	49a. Sheridan, J. Patrick (Orbit Lake Area Property)	PGE	Assess	HLEM, Mag	1987	2.10310	
Tib Lake (G-2660), Armistice Lake (G-694)	52H4/NW, 52H5/SW	49b. Sheridan, J. Patrick (Tib Lake Property)	PGE	Assess	Met, PR	1986	2.9457	
Moss Twp. (G-676)	52B10/SW	50. Storimin Explor. Ltd./ Tandem Resources Ltd. Joint Venture (Hawkins, S. G.)	Au	Assess	EM, Mag	1986	2.9714	
Moss Twp. (G-676), Burchell Lake (G-706)	52B10/SE	51. Tamavack Resources Inc./ Int.'l Maple Resource Corp. Joint Venture Option (Belisle, O.) (Ternowesky, J.)	Au	Assess	DR, DD 8-4422.7 m, SA	1987	-	
Moss Twp. (G-676)	52B10/SE	52a. Tandem Resources Ltd./ Storimin Explor. Ltd. Joint Venture (Storey, A. E.) (Snodgrass Lake Property)	Au	Assess	DD 1-200 m, SA	1986	-	
Moss Twp. (G-676)	52B10/SE	52b. Tandem Resources Ltd./ Storimin Explor. Ltd. Joint Venture (Storey, A. E.) (Snodgrass Lake Property)	Au	Assess	SA	1986	2.9577	
Moss Twp. (G-676)	52B10/SE	52c. Tandem Resources Ltd./ Storimin Explor. Ltd. Joint Venture (Snodgrass Lake Property)	Au	Assess	DD 4-1573.1 m, SA	1987	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Moss Twp. (G-676)	52B10/SE	52d. Tandem Resources Ltd./ Storimin Explor. Ltd. Joint Venture (Storey, A. E.) (Snodgrass Lake Property)	Au	Assess	DD 1-120.8 m	1987	-	
McTavish Twp. (G-675)	52A10/NE	53a. Twomey, T. J. (Big Pearl Lake Property)	Amy	Assess	GL	1986	2.9515	
McTavish Twp. (G-675)	52A10/NE	53b. Twomey, T. J. (Breezy Lake Property)	Amy	Assess	VLF, Mag	1986	2.9653	
McTavish Twp. (G-675)	52A10/NE	53c. Twomey, T. J. (Big Pearl Lake Property)	Amy	Assess	VLF, Mag	1986	2.9829	
Max Lake (G-741)	52H3/NW	54. Vanderploog, George	PGE	Assess	STr	1987	-	
Powell Lake (G-549)	52B7/NW	55a. Wolf River Resources Ltd.	Au	Assess	Tr, IP, SA	1986	2.9947	
Powell Lake (G-549)	52B7/NW	55b. Wolf River Resources Ltd.	Au	Assess	Mech Work	1986	-	

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 4.2

THUNDER BAY MINING DIVISION

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1977	1,964	2,966	5,077	24,879	25,601	4,870	68,727
1978	3,517	1,982	6,612	20,182	20,589	6,206	51,299
1979	3,099	2,139	7,554	11,528	69,612	14,727	101,799
1980	5,527	1,836	11,245	53,418	57,483	5,372	127,288
1981	6,768	4,162	13,851	55,256	172,366	13,863	256,686
1982	10,266	4,613	19,349	133,035	114,805	24,437	292,273
1983	15,835	1,537	33,547	113,554.3	439,992.8	64,789.1	664,891.3
1984	8,389	7,206	34,904	142,488.6	551,863.9	90,107.6	922,977.6
1985	4,353	10,222	29,035	170,022.8	475,736.7	65,802.1	794,099
1986	15,959	13,900	32,097	110,246.86	281,786.04	24,769.64	462,796.44
1987 (to end of Nov.)	15,489	7,418	41,136	174,322.2	700,764	48,111.9	999,383.7

ATIKOKAN AREA

INTRODUCTION

Recent Precambrian mapping projects (Fumerton 1985, 1986; Stone *et al.* 1986) and geochronological studies (Thurston and Davis 1985; Davis and Jackson 1985) have considerably modified the existing geological interpretation of the Atikokan area.

GENERAL GEOLOGY AND STRUCTURE

In the Atikokan area there are three distinct terrains: 1) the Basement Complex; 2) the Atikokan Greenstone Belt, a part of the Wabigoon Subprovince; and 3) the Quetico-Seine Metasediments.

1. The Basement Complex

The Basement Complex consists of the Finlayson Lake Belt, the Lumby Lake Belt, and the Marmion Lake gneissic rocks. Uranium-lead dates from zircons returned ages of 2999 Ma (Davis and Jackson 1985). Thurston and Davis (1985) refer to this group as the Wabigoon Diapiric Axis-Basement Complex. Rocks belonging to the Atikokan Greenstone Belt are unconformably deposited on this complex (D. Stone, Geologist, Atomic Energy of Canada Limited, Ottawa, personal communication, 1985). The unconformity is exposed in the Steep Rock Mine pit.

2. The Atikokan Greenstone Belt

The supracrustal rocks of the Atikokan Greenstone Belt consist of felsic to ultramafic metavolcanics and metasediments. These rocks, along with the Basement Complex, have been intruded by felsic stocks such as the Dashwa Lake Stock.

Geochronological studies on the rocks within the Wabigoon Subprovince have shown ages from 2755 to 2695 Ma (Davis *et al.* 1982; Blackburn *et al.* 1985). No precise dating has been done on the supracrustal rocks in the immediate Atikokan area.

TABLE 4.3

EXPLORATION ACTIVITY IN THE THUNDER BAY-ATIKOKAN AREA

NO.	COMPANY/INDIVIDUAL	TOWNSHIP/AREA	EXPLORATION
1)	Law Occurrence	Asmussen	Prospecting
2)	Mimiska Exploration Incorporated (Harold Lake Gold Mine)	Baker	Mapping, geophysics, diamond drilling
3)	Mimiska Exploration Incorporated (Fern-Elizabeth Property)	Freeborn	Mapping, geophysics, diamond drilling
4)	Plator Gralouise	Marmion Lake	
5)	Falconbridge Limited	Marmion Lake	Diamond Drilling
6)	Butte Exploration Limited (Steward-Sande Occurrence)	Marmion Lake	Trenching
7)	Golden Winner Resources Limited	Lumby Lake	Mapping, geophysics, diamond drilling
8)	Homestake Mineral Development Company (Olcott Showing)	Lumby Lake	Mapping, geophysics
9)	Premier Lake Resources (Anderson Showing)	Lumby Lake	Line cutting
10)	Butte Exploration Limited (Jack Lake Property)	McCaul	Trenching
11)	Atiko Gold Mine	McCaul	
12)	Steep Rock Resources Incorporated	McCaul/Hutchinson	
13)	Y-Knot Resources Incorporated (Mammoth Property)	Hutchinson	Trenching, airborne geophysics
14)	Mimiska Exploration Incorporated (Hill Lake Property)	Hutchinson	Trenching
15)	White Lily Property	Trottier	Prospecting

TABLE 4.3 Continued

16)	Mike Andrews	Weaver	Prospecting
17)	INCO Limited and Fort Knox Gold Resources Incorporated (Pettigrew Mine Property)	Ramsay Wright	Dewatered shaft, mapping, diamond drilling
18)	Phillip Sawdo	Buffo Lake	Trenching
19)	Costy Bumbu	Upsala	Prospecting
20)	Wye Resources Limited (Powell Property)	Saganaga Lake	Trenching
21)	International Maple Leaf Resources Corporation and Tamavack Resources Incorporated	Moss	Mapping, geophysics, diamond drilling
22)	Tandem Resources Limited and Storimin Exploration Limited	Moss	Diamond drilling, decline
23)	INCO Limited	Moss	Trenching, mapping
24)	Rea Gold Corporation and Discovery West Corporation	Moss	Trenching, mapping
25)	North Coldstream Mine	Burchell Lake	
26)	Newmont Exploration of Canada Limited	Kashabowie Lake	Mapping
27)	Lacana Mining Corporation	Burchell Lake	Mapping, trenching
28)	Wilco Mining Company Limited (Vanguard Property)	Shebandowan Lake	
29)	J. F. West	Hagey	
30)	Lincoln Resources Incorporated and Noranda Incorporated (Band-Ore Property)	Conacher	
31)	INCO Limited (Gold Creek Property)	Duckworth	Mapping, geophysics, diamond drilling
32)	Esso Resources Canada	Gorham	Trenching, mapping

TABLE 4.3 Continued

	(Lakehead Gold Mine)		
33)	Noranda Incorporated and Northair Mines Limited	Conmee	Trenching, geophysics, geochemistry, diamond drilling
34)	Matt Berry Mines Limited (Huronian Mine)	Moss	Diamond drilling
35)	Mel Stewart and John Halet	Adrian/Horne	Prospecting
36)	Minnova Incorporated (Cote Zinc Property)	Norway Lake	Trenching, mapping
37)	Minnova Incorporated	Burchell Lake	
38)	INCO Limited (Shebandowan Mine)	Hagey	
39)	Fleck Resources Limited (Great Lakes Nickel Property)	Pardee	Diamond drilling, mapping, sampling
40)	Fleck Resources Limited (Kawene Lake Property)	Hutchinson/ Trottier	Mapping, trenching, diamond drilling
41)	W. Morehouse	Trottier/Weaver	Mapping, trenching, diamond drilling
42)	Fleck Resources Limited (Chief Peter Property)	Chief Peter Lake	
43)	J. P. Sheridan (Tibb Lake Property)	Tibb Lake	Bulk sampling, trenching
44)	Madeleine Mines Limited	Lac des Iles	Diamond drilling, mill construction, bulk sampling
45)	American Platinum Incorporated	Lac des Iles	Geophysics, mapping, trenching, diamond drilling
46)	Cream Silver Mines Limited	Lac des Iles	geochemistry, mapping
47)	Heenan Senlac Resources Limited (Legris Lake Property)	Legris Lake	Mapping, geophysics
48)	Jim Barrett	McTavish	Production of Amethyst

TABLE 4.3 Continued

49)	Dorion Amethyst Mine	McTavish	Production of Amethyst
50)	Diamond Willow Mine	McTavish	Production of Amethyst
51)	Ontario Gem Company	McTavish	Production of Amethyst
52)	Pearl Lake Mine	McTavish	Production of Amethyst
53)	Thunder Bay Amethyst Panorama	McTavish	Production of Amethyst
54)	Mill Rock Resources (O'Connor Barite Showing)	O'Connor	Trenching, diamond drilling

3. The Quetico-Seine Metasediments

The contacts between the Quetico Metasediments (predominantly a wacke-mudstone series) and the Seine Metasediments (polymictic conglomerates, sandstones, and mudstones) are fault bounded in the Atikokan area. It has been suggested that the Seine Metasediments are a proximal facies of the more distal Quetico Metasediments (Wood 1980). Late, felsic to ultramafic bodies intrude them.

The structural geology of the area is complicated and not clearly understood. Work by Borradaile (1982) in the Calm Lake area shows different styles of folding in the Quetico Metasediments and the Atikokan Greenstone Belt. Work by Stone *et al.* (1986) shows the presence of a number of deformation zones. However, Stone *et al.* (1986) do not feel that the Quetico Fault is present in the Atikokan area as a discrete fault. This is in contrast to Fumerton (1985, 1986) who suggests that the Quetico Fault separates the Atikokan Greenstone Belt and Quetico Metasediments. Stone *et al.* (1986) stated that the deformation zones within the older Basement Complex, such as the Marmion Lake Batholith, do not extend into the Atikokan Greenstone Belt.

STYLES OF GOLD MINERALIZATION

The modified geological framework of the Atikokan area, together with new ideas on gold mineralization as per Colvine *et al.* (1984), suggests that there should be further modifications to the classification of gold mineralization as proposed by Wilkinson (1982) and modified by Schnieders and Dutka (1985).

Wilkinson (1982) outlined three general types of gold mineralization concentrated in quartz and quartz-carbonate veins: Marmion Lake Batholith Type, Contact Zone Type, and Metavolcanic-Hosted Stratabound Type. Recent studies have led to a modified classification with four proposed styles of gold mineralization, each with a distinct structural setting:

1. vein systems within ductile shear zones
2. vein systems controlled by inhomogeneities in the Marmion Lake Batholith
3. margins of stocks
4. carbonate-rich shear zones within the mafic metavolcanics

Details of the classification can be found in Patterson *et al.* (1986).

Fern-Elizabeth Property

The Fern-Elizabeth Property, located 6.5 km northwest of Atikokan, is being examined by Mimiska Exploration Incorporated of Montreal. The exploration program consists of line cutting, geology, trenching, geophysics, and diamond drilling (30 000 feet planned for 1987). Previous work on the property is described in Schnieders and Dutka (1985).

The general geology of the Fern-Elizabeth Property consists of mafic metavolcanic rocks and dioritic intrusive rocks in contact with a granitic body (leucotonalite). A series of shear zones cut all units (Fumerton 1986).

In detail, the mafic metavolcanic rocks are cut by early silicified shear zones intruded by a later leucotonalite body. The leuco-tonalite and mafic metavolcanic rocks are well foliated. A massive mafic dike, equigranular to porphyritic (containing 10 to 20 percent, 1 to 3 cm feldspar phenocrysts), cuts both the leuco-tonalite and the mafic metavolcanic rocks. Late granitic and lamprophyre dikes intrude all rocks.

Three separate shearing and faulting events occur:

1. The earliest set of shears are 3 to 5 m wide and consist of chlorite-carbonate schists with mineralized quartz veins. The shears have a general 010° to 020° strike and 80° to 85°W dip, with minor folds and lineations plunging 75° north. The quartz veins occur as stacked sets. Individual veins are 10 cm to 1 m wide and trend 30° to the general strike of the shear zone. Locally, the veins comprise up to 30 percent of the zone. The asymmetry of the veins indicate a component of

right-hand movement. The Elizabeth Vein (No. 1 shaft), Contact Vein (No. 2 shaft), Grizzly Vein, and Bernie-Mitch Vein reported in Schnieders and Dutka (1985) belong to this generation of veining.

2. Shear zones, trending 115°, contain highly foliated carbonate-chlorite schists. These shear zones cut the earlier mineralized shear zones. It is possible that the main vein at the No. 1 shaft and the Grizzly Vein are the same vein offset along a 115°-trending shear.
3. Narrow sharp faults less than 2 cm wide, with little shearing, striking 050°, and dipping 45°S, cut the northern end of the Grizzly Vein. Dragging indicates a right-lateral sense of movement.

Mineralization is associated with quartz veins on the contact between granitic rocks to the west and mafic metavolcanic rocks and diorite to the east. The veins (three generations) consist of an unmineralized, undeformed, white sugary quartz; a mineralized grey-blue, deformed quartz; and a barren, highly deformed, white quartz. Within the grey-blue quartz, native gold, tellurobismuth, and pyrite occur on sericite-chlorite slips.

Alteration occurs in all rock types near the mineralized Contact Vein (No. 2 shaft). Within the granitic rocks, as the quartz vein contact is approached, the following alteration sequence is observed: 15 m of hematization; 5 m of sericitization (pseudomorphing plagioclase); 2 m of sericitization-carbonatization; and 50 cm of biotite-sericite-carbonate alteration adjacent to the vein. The mafic metavolcanics or diorite are altered to 15 m of chlorite schist, 5 m of chlorite-biotite schist, and 2 m of biotite-carbonate schist as the Contact Vein is approached. Drilling by Camflo Mines Limited, in 1982, intersected 7.8 feet of 0.366 ounce gold per ton in drillhole FE-82-3 (core stored in the Thunder Bay Drill Core Library).

Mimiska Exploration Incorporated announced recent developments on the Fern-Elizabeth Property in their 1986 Annual Report:

> "Samples retrieved from the Bernie-Mitch Vein show exceptional gold amounts (up to 5%); the Grizzly Vein returned a surface value of 8.8 grams of gold per tonne over 32 meters (105 feet) across an average width of 1.3 meters (4.3 feet); the Elizabeth Vein returned values varying from 5.9 grams of gold per tonne to 9.0 grams of gold per tonne across 1.5 meters (5 feet) to 3.5 meters (11.5 feet) in width."

Further:

> "The best hole (MF86-9) grading 9.8 grams of gold per tonne over 13 m including a portion grading 11.5 grams of gold per tonne"

A preliminary scintillometer survey of core indicates an anomaly over the Contact Vein. This is likely due to the enrichment of potassium in the alteration zone (G. Clark, Office Manager, Ovaltex Limited, Thunder Bay, personal communication, 1987).

The Hill Lake Property

The Hill Lake Property is located in central Hutchinson Township, approximately 26 km east of Atikokan. The general geology and exploration history is outlined in Schnieders and Dutka (1985). Mimiska Exploration Incorporated is currently planning an exploration program consisting of trenching and diamond drilling.

Detailed mapping of the Baseball Diamond trenches (TB 385719) shows an east-trending shear zone developed along the contact between the Marmion Lake Batholith (to the north) and mafic metavolcanics/mafic dikes (to the south). The shear zone is 20 to 35 m wide. The strike of the foliation within the shear zone varies from 90° in the west to 65° in the east. A number of sigmoidal quartz veins are developed. The largest vein is 30 m in length and up to 5 m in width. Within the large, white veins are bands of mineralized, dark grey quartz containing arsenopyrite, pyrite, chalcopyrite, and galena. Both types of quartz are locally brecciated and cemented together by tourmaline. This breccia is locally crosscut by a second generation of white quartz veins.

A strong alteration zone, on either side of the mineralized contact zone, is evident in the core drilled by Camflo Mines Limited in 1982 (diamond-drill hole H-3 stored in the Thunder Bay Drill Core Library). Alteration in the granitic rocks consists of 50 m of sericite alteration pseudomorphing plagioclase. Shearing produced zones of sericite schist becoming stronger near the contact with the mafic rocks. Tourmaline-bearing fractures cut the sericite alteration. Alteration in the mafic metavolcanics/mafic dike rocks produced 20 m of chlorite schist with 2 m of chlorite-carbonate schist near the contact with the granitic rocks. The mineralized quartz veins cut the foliation in the schists. Fragments of wall rock within the quartz vein are converted to tourmaline. Arsenopyrite phenocrysts overgrow the foliation in the wall rock.

This suggests two periods of alteration, one associated with shearing (sericite in the granitic rocks, chlorite and carbonate in the mafic volcanic rocks) and one associated with mineralization (tourmaline, quartz, and arsenopyrite). The alteration associated with mineralization is later than the shear zone related alteration.

The Mammoth Property

The Mammoth Property is located on the northern shore of Sapawe Lake, Hutchinson Township, approximately 16 km east of Atikokan. The property has recently been optioned to Y-Knot Resouces Incorporated.

The original claims were staked in 1902 (ES21). A number of trenches were reported by Hawley (1929). More recently, several large areas have been stripped and trenched. Two zones of mineralization are known: the Main Zone and the New/Beaver Pond Zones.

The main zone is exposed in three trenched areas along an east-west strike length of 1 km on the northern shore of Sapawe Lake (claims TB 659959 and TB 659960). The trenches expose an intensely altered mafic dike (now a chlorite-fuchsite-carbonate schist) 30 m wide and locally folded, containing up to 20 percent quartz veins. The mafic dike is hosted by strongly deformed Quetico metasediments (wackes and conglomerates). Within the metasedimentary rocks, an intrusion of quartz-feldspar porphyry produces a pressure shadow. Here, the shape (or aspect ratio) of the cobbles in the conglomerate is 2 to 1. Outside the pressure shadow, the cobbles are stretched 20 to 1. Folded foliation is visible at several locations. To the north of the trenched area is a series of granitic outcrops cut by mafic dike rocks belonging to the Wabigoon Subprovince. A strong case for the presence of the Quetico Fault running through these trenches can be made.

Mineralization (pyrite, chalcopyrite) is associated with quartz veins hosted by the highly altered mafic dike. The quartz veins formed as tension fractures. An early generation of veins have been rotated and cut by another generation of quartz veins. The best assay reported was 0.34 ounce gold per ton across 3 feet (Resident Geologist's Files, Ministry of Northern Development and Mines, Mines and Minerals Division, Thunder Bay).

A second zone (Beaver Pond and New Showing) occurs approximately 1 km north of the Main Zone. The occurrence was described by R.V. Oja (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay):

> "Both showings contain numerous quartz veins in a sheared carbonate-sericite-siliceous matrix. The Beaver Pond showing has a length of 300 feet and a width of 7 feet striking N80°E dipping steeply to the south...here (the New Zone). However, the shear zone is considerably wider...an approximate width of at least 60 feet."

A 1985 airborne magnetic survey by Terraquest Limited shows the zones to be associated with magnetic lows (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

The Atiko Gold Mine

The Atiko Gold Mine is located in the east central portion of McCaul Township approximately 16 km east of Atikokan. As part of the Resident Geologist's program, three large outcrops were stripped with the assistance of the Ministry of Natural Resources' Junior Rangers. The purpose of the stripping was to determine contact relationships.

The following sequence of intrusive structural events is presented from oldest to youngest:

UNIT 1 The oldest rock is fine grained, dark green, and massive, composed of 50 percent hornblende and 50 percent altered feldspar. There are no textures present to differentiate between a volcanic or intrusive origin for the unit.

UNIT 2 This is a chlorite-rich granitic rock composed of 20 percent quartz, 60 percent sericite pseudomorphing feldspar, and 20 percent chlorite after mafic minerals, which cuts only Unit 1.

UNIT 3 This is a fine-grained, highly altered mafic dike, which cuts Unit 2.

UNIT 4 A pegmatitic granitic rock crosscuts the mafic dike and the chlorite-rich granitic rock.

UNIT 5 All of the above rocks are cut by a quartz and plagioclase-rich granitic rock (trondhjemite).

UNIT 6 A fine-grained quartz porphyry, containing fragments of the trondhjemite, intrudes the trondhjemite (Unit 5).

UNIT 7 A shear zone, represented by a sericite-carbonate schist (blasto-mylonite), follows the general contact of the trondhjemite with Units 1 to 4. The zone can be traced for 3 km in a general east-west direction. Drill results indicate widths of up to 30 m (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay). The trondhjemite in contact with the shear zone is hematized.

UNIT 8 Three generations of quartz veining occur in the shear zone:

a. The oldest is a white, apparently barren, quartz vein which is deformed and brecciated.

b. Cementing the white quartz together is a mineralized blue-grey quartz. The mineralization consists of pyrite with inclusions of native gold and two unidentified tellurides. In the polished section, the pyrite is observed to be fractured and cemented together by gold. Gold also occurs along narrow blue-grey quartz fracture-fillings in the white quartz.

c. A barren, quartz-carbonate-tourmaline vein cuts the earlier quartz veins. Tourmaline is developed on the vein margin.

UNIT 9 A mafic, feldspar porphyry dike or sill intrudes all units, including the quartz veins.

UNIT 10 A Proterozoic (Logan) diabase dikes cut all units.

This sequence of structural and intrusive events, together with old underground plans, allowed the interpretation of a geological map produced by R. Bernatchez (Consultant Geologist, Atikokan). This map (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay) suggests the presence of faults, striking 010° to 020°, which offset the mineralized horizon by up to 30 m. The underground plans also suggest drifts ending, in both an east and west direction, on faults of this orientation. A southern warping of the zone may have been caused by dragging against the eastern fault.

Other Property Visits

PHIL SAWDO, BUFFO LAKE AREA

The Buffo Lake area is located approximately 40 km northeast of Atikokan in the Lumby Lake greenstone belt. A number of showings examined by Mining North Exploration Limited are described by Schnieders and Dutka (1985). Phil Sawdo, prospector, has found two new showings on claim TB 966086.

The claim is underlain by granitic rocks of the Marmion Lake Batholith which have been intruded by mafic dikes. At two locations, a shear zone with mineralized quartz veins is developed within mafic dikes. The veins and mafic dikes trend at 040°. The southern vein ranges from 50 to 100 cm in width and can be traced for 80 m. Mineralization consists of pyrite and chalcopyrite. Grab samples returned 0.02 ounce gold per ton (Ontario Geoscience Laboratory, Ontario Geological Survey, Toronto).

MIKE ANDREWS SHOWINGS

The property is located in west central Weaver Township approximately 18 km east of Kawene. The general geology (Pirie 1978) consists of a band of mafic to felsic metavolcanics, 3 to 5 km wide, with the Marmion Lake Batholith to the north and the Quetico Metasediments to the south. The metavolcanics belt is separated from the Quetico Metasediments by the Quetico Fault. The property is 1 km north of the Quetico Fault and is underlain by mafic to felsic metavolcanic rocks. Two showings have been discovered.

On claim TB1010545, an east-west shear zone (chlorite-sericite-carbonate schist) is developed within mafic metavolcanic rocks. The shear zone contains two generations of quartz. The earlier generation of quartz is deformed into lenses parallel to foliation, 1 m wide and up to 10 m long, and is cut by later, narrow (2 to 10 cm) quartz veins carrying arsenopyrite, chalcopyrite, and pyrite.

On claim TB975485, a carbonate-rich shear zone is exposed on a small island in an unnamed lake. The foliation is folded and locally, a second foliation is developed. Grab samples are reported to run up to 0.15 ounce gold per ton (M. Andrews, prospector, Atikokan, personal communication, 1987).

GOLDEN WINNER PROPERTY

The Golden Winner Property is located 4 km southeast of Red Paint Lake, approximately 35 km northeast of Atikokan. In 1987, Golden Winner Resources Limited carried out a program of geological mapping, trenching, geophysics, and diamond drilling.

The trenches expose rocks of the Marmion Lake Batholith cut by a swarm of mafic dikes. The mafic dikes are altered to carbonate and, where sheared, a chlorite-carbonate schist is formed. A series of complex vein systems are developed within the shear zones (chlorite-carbonate schist). Individual veins are up to 2 m wide and can be traced for 20 m. Mineralization in the veins consists of pyrite, galena, and chalcopyrite. Green mica is commonly developed on the vein margins.

COSTY BUMBU SHOWINGS, UPSALA AREA

The property is located 6 km west of Upsala on Highway 17 near the Stedman-Upsala Township Line. The general geology consists of a 2 km wide, east-trending greenstone belt with granitic rocks to the north and south.

A band of metawackes with sulphide-bearing iron formations is exposed on Highway 17. A fold nose (40 m across) is present in the iron formation. Near the fold closure, a series of narrow quartz veins with sulphide minerals are developed. Grab samples returned up to 0.06 ounce gold per ton. (C. Bumbu, Prospector, Thunder Bay, personal communication, 1987.)

Airborne electromagnetic and total intensity magnetic survey maps 80534 and 80536, Ontario Ministry of Northern Development and Mines, show two parallel east-trending bands of coincidental magnetic highs and EM conductors. Possible folds and zones of lower magnetic response are evident.

GENERAL EXPLORATION PROGRAMS

1. Minnova Incorporated has carried out a preliminary exploration program on the Cote Zinc showing (35 km northeast of Atikokan), Lumby Lake greenstone belt. Previous work by Mining North Exploration Limited discovered a felsic unit containing up to 7 percent zinc associated with chloritoid alteration.
2. Homestake Mineral Development Company explored their property in the Red Paint Lake area, Lumby Lake Belt. A number of occurrences, including the Alcock showing were reexamined.
3. Falconbridge Limited continued work on their Hammond Reef Property, 18 km northeast of Atikokan.
4. Trenching was carried out by Butte Exploration Incorporated (formerly Westech Resources Limited) on the old Jack Lake Mine property, in north central McCaul Township.
5. Trenching and diamond drilling were carried out by Fleck Resources Limited on a series of mafic intrusions south of Crooked Pine Lake.
6. Inco Limited, in a joint venture with Fort Knox Gold Resources Incorporated, dewatered the Pettigrew Mine and carried out diamond drilling. The property is located in the central portion of Ramsay-Wright Township.
7. Butte Exploration Limited (formerly Westech Resources Limited) has started work on the Steward-Sande Property, Lynx Head Narrows, Marmion Lake.

EXPLORATION SUGGESTIONS AND GUIDES

1. The alteration pattern associated with gold mineralization varies with the rock type affected:
    a. in granitic rocks: hematite, sericite, and carbonate
    b. in mafic rocks: chlorite, carbonate, and biotite
    c. associated with the veins: tourmaline and green mica

The size of the alteration halo is large enough to be useful in prospecting. Significant amounts of potassium have been added. Most of the unaltered host rocks of the gold-bearing systems are low in potassium. A scintillometer survey may detect the weakly radioactive potassium outlining the alteration zone.

2. A comparison of known areas of gold mineralization to geophysical maps indicates that many of the known gold occurrences are associated with magnetic lows and/or weak EM conductors.
    a. Along the northern shore of Sapawe Lake, a magnetite-bearing gabbro gives a high magnetic signature. There are a number of lows within this trend. In patented claim FF3507, Steep Rock Iron

Mines Limited drilled a number of magnetic lows in 1940. One hole intersected 50 feet of arsenopyrite-bearing schist containing 0.02 to 0.15 ounce gold per ton (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). These magnetic lows represent exploration targets.

b. Along the northern shore of Crooked Pine Lake are a number of lapsed patented claims, staked prior to 1900. Before the turn of the century, it was necessary to prove "mineralization in place" before the claim could be registered. Near the centre of these blocks are magnetic lows, suggesting alteration and possible gold mineralization.

3. On a number of properties, both prospectors and companies have attempted to follow veins or foliation along strike. When exposed by stripping, it was discovered the veins are S-shaped within the shear zone host. The vein direction is misleading. The key indicator is the general trend of the shear zone, not the internal foliation of the shear zone or strike of the vein.
4. A number of quartz-carbonate vein systems are exposed in road cuts between the Ontario Hydro Site (10 km north of Atikokan) and Finlayson Lake. The veins are hosted in Marmion Lake Batholith rocks. Individual veins are from 10 to 100 m wide and can be traced for up to 50 m. The host rocks are altered to sericite-carbonate schists similar to the Hill Lake Property. Mineralization in the veins consists of chalcopyrite, pyrite, and molybdenite. The only anomalous gold analysis (300 ppb) came from a pod of massive pyrite near the southern end of the Finlayson Lake diversion (or Esker cut).
5. Quetico metasedimentary rocks which have been highly deformed (adjacent to the Quetico Fault or Seine River Fault) should be explored for their gold potential.

THE SHEBANDOWAN AREA

INTRODUCTION

The Shebandowan greenstone belt forms the western extension of the Wawa Subprovince, Superior Structural Province. Quetico metasediments occur to the north and the Northern Lights Lake gneissic complex to the south. Proterozoic rocks overlap the Archean rocks on the east.

The Archean greenstone belt is subdivided into two groups:

1. "Keewatin-type" volcanics, an older metavolcanic unit with minor metasedimentary rocks;
2. "Timiskaming-type", a younger metavolcanic-metasedimentary unit.

Due to the lack of direct correlation to the original Timiskaming lithostratigraphic unit, defined in the Kirkland Lake area, some workers, including Brown (1985) and Kehlenbeck (1987), have suggested the younger unit in the Shebandowan area be termed "Shebandowan-type" rocks. However, for the reasons outlined below, the term "Timiskaming-type" is used by the author.

The original definition of the Timiskaming in the Kirkland Lake area, by Cook and Moorhouse (1969), is based on a suite of alkalic metavolcanics and associated sediments lying unconformably on Keewatin-type rocks. In the Shebandowan area, the contact is not exposed. Detailed mapping by Carter (1985) in Forbes and Conmee Townships, and regional mapping by Thurston (1984) in the Thunder Bay area, shows the general trends of lithologic units of Keewatin type rocks truncated by Timiskaming-type rocks. Further, it has been suggested that some of the Timiskaming-type metavolcanics (or late Keewatin-type) are conformable, while all Timiskaming-type metasediments are unconformable. (M. Carter, Geologist, Precambrian Geology Section, Ontario Geological Survey, personal communication, Toronto, 1987). Mapping in Gorham Township by Kehlenbeck (1987) indicates the Timiskaming-type and Keewatin-type rocks are in fault contact.

Shegelski (1980) has shown the Timiskaming-type metavolcanic rocks in the Shebandowan area have a chemistry similar to the alkalic rocks in the Kirkland Lake area.

LITHOLOGIC CHARACTERISTICS OF TIMISKAMING-TYPE ROCKS

Due to increased exploration in the Shebandowan area, and the relatively large number of gold occurrences in Timiskaming-type rocks, the Resident Geologist has received a number of requests for a definition of Timiskaming-type rocks. Any lithologic classification must be treated with caution. The ultimate division is based on the presence of an unconformity, whose presence or absence is based on regional mapping criteria. The following summary of criteria was gathered from conversations with P. Thurston, L. Chorlton, M. Sanborne, G. Stott, and J. Scott, all Geologists with the Precambrian Geology Section, Ontario Geological Survey, Toronto.

Timiskaming-type rocks exhibit either all or a portion of the characteristics listed below:

1. Chemically, the volcanic rocks belong to the alkalic suite. High potassium rocks, such as shoshonites, are common. The potassium to silica ratios are in the order of 1:25. However, it should be pointed out that alkalic suites of rocks within the "Keewatin" may be more common than is realized. Most classifications, Alkalic-Iron-Magnesium (AFM) or Titanium-Zirconium-Yttrium, do not delineate alkalic rocks. Many workers tend to attribute the high potassium content of the Keewatin-type rocks to alteration.
2. The volcanic units are characterized by the presence of coarse, 2 to 4 mm, lath-shaped hornblende phenocrysts within flow and pyroclastic rocks of basaltic to shoshonitic composition. Hornblende phenocrysts appears to be relatively rare in Keewatin-type rocks.
3. More rarely, trachytes, containing aligned, lath-shaped feldspars, are observed in some of the fragmental units, and as flows up to 50 m thick. In contrast, quartz phenocrysts are typical of the Keewatin-type calc-alkalic volcanic rocks.

4. Red to green coloration is common in many of the units. A similar coloration has been observed in Keewatin-type rocks close to the Proterozoic unconformity.
5. The metasediments consist of polymictic conglomerates and chemical metasediments, notably magnetite-jasper and magnetite-ironstone. The polymictic conglomerates contain clasts of Keewatin-type and Timiskaming-type volcanic rocks. Distinctive red chert fragments are common in minor amounts. Wackes, siltstones, and gritty siltstones contain well-preserved structures such as ripple marks, scours, rip-up clasts, mud cracks, and ball-and-pillow structures.
6. Intrusive phases include hornblende- or mica-bearing lamprophyres, and syenitic rocks.
7. Brown (1985) suggests the Timiskaming-type rocks are less deformed and altered than Keewatin-type rocks, although both units have suffered the same styles of deformation.

Snodgrass Lake: Tandem-Storimin Property

The Snodgrass Lake Property is located approximately 110 km west of Thunder Bay in Moss Township. Currently, a program of advanced exploration is being carried out by Storimin Exploration Limited in a joint venture with Tandem Resouces Limited. Extensive diamond drilling has been carried out. Underground development includes approximately 850 m of decline (December 1987), with crosscuts and drifts planned on the 212- and 420-foot levels. Bulk samples will be taken from the 212- and 420-foot levels. Current reserve estimates are 800 000 tons at 0.2 ounce gold per ton (The Northern Miner, July 13, 1987). Several additional zones on the property are being examined by drilling.

The general geology of the Snodgrass Lake area is outlined in Chorlton (1987). Rock units trend at 060°. Mafic metavolcanics, in part silicified, occur on the eastern and southern sides of Snodgrass Lake. Felsic metavolcanics, feldspar-rich tuff and dacite breccia occur on the northern and western shores of the lake. Three diorite bodies, located on the Tandem-Storimin Property near the northern side of Snodgrass Lake, on the Tandem-Storimin Property near the southwestern end of Snodgrass Lake, and 300 m west of the southern tip of Snodgrass Lake on the Tamavack-International Maple Leaf Property, intrude the felsic metavolcanics. Late syenite, latite, and feldspar porphyry dikes cut all rock types.

The diorite located near the northern end of Snodgrass Lake is truncated in the west by a fault trending 020°. The diorite located near the southern end of the lake may be the faulted extention of the northern diorite. The diorite on the northern shore of Snodgrass Lake is massive, equigranular, green, and consists of 50 percent plagioclase and 50 percent hornblende. Rare phenocrysts of hornblende, ranging up to 4 mm in size, occur. The plagioclase is pervasively altered to epidote. A complex series of feldspar porphyry dikes cuts the diorite.

Alteration associated with mineralization consists of a broad zone, up to 20 m in width, of albite-quartz alteration affecting both the diorite and the feldspar dikes. Intermediate stages of albite-quartz alteration affect the epidotized plagioclase first, producing a white rock that contains 75 percent albite/quartz and 25 percent unaltered hornblende remnants. This rock may have been referred to as a tonalite by earlier workers. The totally albitized rock is extremely fine grained and porcelaneous, with the appearance of a felsic volcanic. Both Harris (1970) and Chorlton (1987) have mapped inclusions of felsic volcanic material in the diorite; these inclusions typically contain quartz phenocrysts in a sericitic matrix.

A late hematitic alteration often associated with brittle, vuggy carbonate veins, produces a brick-red colouration in all units.

The silicified-albitized diorite and feldspar porphyry dikes are sheared to produce sericite and sericite-chlorite schist, respectively. Narrow, grey-blue quartz veins intrude the sericite schist. The quartz veins comprise up to 10 percent of the zone. Mineralization in both the veins and the sericite schist consists of 1 to 3 percent pyrite and minor chalcopyrite.

In addition to the mineralized zone described above, other anomalous gold values have been reported by Chorlton (1987). On the eastern shore of Snodgrass Lake, in silicified mafic volcanic rocks, analyses of up to 65 ppb gold, 66 ppm arsenic and 24 ppm molybdenum have been obtained, and in the diorite located on the southern shore of Snodgrass Lake, analyses of 90 ppb gold and 1180 ppm copper were noted.

Stewart–Halet Property

The Mel Stewart–John Halet Property is located near the corners of Sackville, Laurie, Horne, and Adrian Townships. The general geology of the property consists of intercalated felsic, intermediate and mafic aphanitic flows, and inter-flow chert and graphitic schists. These rocks are in unconformable contact with Timiskaming-type conglomerates and clastic metasedimentary rocks.

The main showing is situated on the Adrian-Horne Township boundary, approximately 3 km east of the Laurie and Sackville boundary. The showing comprises intensely carbonatized, silicified felsic tuff and fragmental rock, containing very fine-grained, disseminated pyrite. The rocks bear a resemblance to those in the main showings of Inco's Gold Creek Property (Chorlton 1987). Assays up to 0.02 ounce gold per ton have been reported. (Mel Stewart, Prospector, Thunder Bay, personal communication, 1987).

Tamavack Resources Incorporated and International Maple Leaf Resource Corporation Joint Venture

The property is located 110 km west of Thunder Bay in Moss Township, adjacent to the Tandem Resources Limited-Storimin Exploration Limited property. A program of geophysics and diamond drilling was carried out on the property during 1987.

Diamond drilling intersected a wide zone of silicification, sericitization, hematization, and brecciation associated with a resistivity-chargeability induced polarization (IP) anomaly. A direct relationship between gold and sulphide mineral (pyrite) content is reported. The best results are 0.07 ounce gold per ton across 4.85 feet and 0.06 ounce gold per ton across 3.0 feet (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

For a description of the general geology, see the Tandem-Storimin property (above).

Noranda-Northair Property, Conmee Township

Noranda Incorporated (62.5 percent) and Northair Mines Limited (37.5 percent) are in joint venture on a property 32 km west of Thunder Bay in Conmee Township. A program of mapping, geophysics, geochemistry, trenching, and diamond drilling is being carried out on the property.

General geology consists of felsic to mafic metavolcanics (Keewatin-type) which are overlain by Timiskaming-type metasediments (conglomerate and sandstones). A syenite intrudes both units.

Diamond drilling reports a number of anomalous zones associated with altered breccia. Included are

S85.5 (TB814025) 0.97 g/t across 3 m;
S85.4 (TB814025) 1.37 g/t across 2 m;
S85.3 (TB814026) 1.89 g/t across 2 m;
S85.2 (TB829218) 2.40 g/t across 1 m; and
S85.1 (TB828218) 0.99 g/t across 5 m.

(Resident Geologist's Files, Ministry of Northern Development and Mines, Mines and Mineral Division, Thunder Bay).

Additional results announced in The Northern Miner, July 20, 1986, include 6.6 feet of 0.48 ounce gold per ton and 6.6 feet of 0.14 ounce gold per ton.

Vanguard Occurrence (Wilco Mining Company Limited)

The Vanguard Occurrence is located on patented claims K56 and 71Z on the northern shore of Upper Shebandowan Lake, approximately 100 km west of Thunder Bay. The property has been optioned by Wilco Mining Company Limited.

Massive-sulphide minerals (chalcopyrite, sphalerite, and pyrite) associated with cherty horizons are hosted by chloritic schists and felsic pyroclastic rocks (felsic to cherty clasts, up to 10 cm, in chloritic matrix).

Two mineralized zones are known on the property. Reserves are reported to be: west zone (K56) 150 000 tons at 1.30 percent copper, 0.02 ounce gold per ton, and 0.25 ounce silver per ton; east zone (71Z) 81 000 tons at 1.80 percent copper and 0.04 ounce gold per ton (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

Individual drillholes (e.g., And No.8) have returned up to 5.0 feet of 2.90 percent copper, 0.40 ounce gold per ton, and 3.12 ounces silver per ton. (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

Wye Resources Limited

The Wye Resources Limited Property (also known as the Curran Bay Resources Limited Property or Powell showing) is located 25 km west-southwest of Thunder Bay, near the northern shore of Saganaga Lake. Wye Resources Limited has trenched a number of showings, and plans a drill program.

The general geology consists of mafic metavolcanics intruded by feldspar porphyry and gabbroic bodies. On the Powell showing (TB776841), a shear zone traced for 500 m trends at 025°, cutting the mafic metavolcanics and feldspar porphyries. The shear offsets the porphyries by up to 20 m. Discontinuous lenses and pods of quartz veins, up to 30 m by 1 m with a near-vertical dip occur along the shear. Mineralization consists of chalcopyrite and pyrite. Grab samples returned up to 0.774 ounce gold per ton. (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

Drill results on the main showing from Curran Bay Resources in 1984, include 13.1 feet of 0.83 ounce gold per ton, 6.9 feet of 0.77 ounce gold per ton, and 14.1 feet of 0.30 ounce gold per ton. All holes were drilled at 045° inclination and azimuth 330° (Resident Geologist Files, Ministry of Northern Development and Mines, Thunder Bay).

Two other showings on the property have returned significant values: the West Showing (or Minnow Pond showing), claim TB776837; and the North Showing, claim TB814090. Grab samples from the North Showing returned values up to 0.145 ounce gold per ton and grab samples from the West Showing returned values up to 0.110 ounce gold per ton. (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

Other Exploration Programs

1. Matt Berry Mines Limited has carried out diamond drilling near the Minoletti Occurrence, approximately 3 km southwest of the Huronian Mine, approximately 115 km west of Thunder Bay. Mineralization is associated with a quartz porphyry intruded into possible Timiskaming-type conglomerates (Chorlton 1987). Matt Berry Mines Limited has entered into an agreement with Tandem Resources Limited to explore the Huronian Mine adjacent to the Minoletti Property. For detailed geology, see the Thunder Bay Drill Core Library section of this report.
2. INCO Limited has carried out extensive trenching on their Burchell Lake property adjoining the Tandem-Storimin property on the east.
3. INCO Limited has optioned the Gold Creek Property in Duckworth and Laurie Townships. Previous work by Jalna Resources Limited has outlined several mineralized zones (Chorlton 1987). Anaconda Canada Exploration Limited intersected anomalous gold values of 70 to 975 ppb for over 50 m in diamond-drill hole GC.08. The values are associated with altered quartz-crystal tuffs (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay). For detailed geology, see the Thunder Bay Drill Core Library section in this report.

4. Other companies active in the area include:
   - a. Newmont Exploration of Canada Limited, near Burchell Lake;
   - b. Lacana Exploration Incorporated, east of the North Cold Stream Mine, Burchell Lake;
   - c. Cominco Limited, on their Hagey Township claims;
   - d. Royex Gold Mining Corporation, Horne Township;
   - e. Minnova Incorporated, Moss Township, south of Burchell Lake;
   - f. Esso Resources Canada Limited, trenching on the Lakehead Gold Mine, Gorham Township; and
   - g. Discovery West Corporation and Rea Gold Corporation, on the western side of Burchell Lake.

LAC DES ILES AREA

INTRODUCTION

The Lac des Iles area is located approximately 85 km north of Thunder Bay. Currently, Madeleine Mines Limited has completed a road from Highway 527 to the property. The site is being prepared for an open pit operation, and footings are being poured for the crusher and mill. Several companies have carried out exploration elsewhere on the intrusive complex.

Cream Silver Mines Limited

The Cream Silver Mines Limited Property is located on the northern and eastern sides of the Lac des Iles intrusion. A program of geological mapping and trenching was carried out in 1986.

According to Parker and Hood (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay), the properties overlie the northern ultramafic intrusion (wehrlite; olivine and clinopyroxene cumulates and websterite; orthopyroxene-clinopyroxene cumulates). A number of mineralized zones are known. The Peninsula Zone in the southwestern corner of TB886451 returned values up to 345 ppb platinum and 620 ppb palladium. The Anomaly Zone in claim TB886439 returned 340 ppb platinum. A soil geochemical anomaly is associated with this Zone. The Murph Zone in the northeastern corner of TB886442 returned up to 300 ppb platinum and 340 ppb palladium. All mineralized samples contain minor sulphide minerals (less than 1 percent pyrrhotite and chalcopyrite).

The American Platinum Incorporated Property

The American Platinum Incorporated Property is located on the southern side of Lac des Iles, adjoining the Madeleine Mines Property on the east. A program of geological mapping, geophysics, trenching, and diamond drilling was carried out in 1987. The eastern extension of a mixing zone that is host to the Roby Zone on the Madeleine Mines Property, occurs on the property. The mixing zone is up to 350 m wide and consists of pegmatitic gabbro and breccias. On the Madeleine Mines Property, this zone occurs at the contact between two gabbroic bodies. However, on the American Platinum Incorporated Property, the mixing zone occurs between a gabbroic body and granitic rocks. Sampling defined a zone of elevated Platinum Group Element (PGE) values on claims TB873411 and TB908327, associated with the mixing zone. The highest palladium value reported was 5276 ppb and the highest platinum value reported was 532 ppb (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

THUNDER BAY DRILL CORE LIBRARY, by G. White and P. Hinz

The Thunder Bay Drill Core Library is geographically central to the Thunder Bay Mining Division, and provides a focus for the collection, storage, and examination of diamond-drill core for three Resident Geologists' areas: Beardmore-Geraldton, Schreiber-Hemlo, and Thunder Bay. In addition to providing a valuable reference collection, assistance in logging, sampling, splitting, and assaying is available. During 1987, a total of 16 789 m of diamond-drill core was collected or brought into the facility from 25 mineral occurrences and active prospects in the region. Approximately 61 424 m of drill core are presently stored, representing less than half of the library's designated capacity of 160 000 m.

The Resident Geologists' reports for the three areas serviced by the Thunder Bay Drill Core Library contain detailed descriptions of both geologically representative and geologically unique sites represented in the collection. Table 4.4 lists the 1987 contributions to the drill core library from the Thunder Bay Resident Geologist's area.

A heavy increase of 286 percent in the use of the facility was experienced in 1987. While users numbered 140 in 1986, they exceeded 400 in 1987. The primary users are mining and exploration company personnel, prospectors, and to a lesser extent, university students and academics. Visitors touring the facility included State Geologists from the Minnesota Department of Natural Resources, a representative of the Brazilian Government, and the Geoscientific Exchange Delegation from Jiangsu Province, China.

The Thunder Bay Drill Core Library has also experienced an increase in use by the Ontario Geological Survey, and Offices of the Resident Geologists as the potential of the facility is being fully recognized. In this capacity, the facility offers an extension service, in terms of providing geoscience and geotechnical expertise and equipment, thereby supplementing ongoing programs.

For a complete, catalogued listing of all diamond-drill core stored at the Thunder Bay facility (excluding confidential material), please write to the following address or telephone:

Drill Core Library
Ministry of Northern Development and Mines
435 James Street South
Thunder Bay, Ontario
P7C 5G6
(807) 475-1331

TABLE 4.4 **THUNDER BAY DRILL CORE LIBRARY SUMMARY, 1987**

PROPERTY NAME (By Resident Geologist Area)	COMPANY	LOCATION (Area, Twp)	NO. OF DDH's	TOTAL DRILLED (meters)
THUNDER BAY				
1. Gold Creek Property	Anaconda Canada Exploration Limited	Duckworth/Laurie Twps.	13	1,158
2. Lac des Iles Project	International Platinum Corp.	Lac des Iles Area	3	701
3. Wakinoo Lake Project	Texasgulf Inc.	Wakinoo Lake Area	5	792
4. O'Connor Barite Occurrence	J.P. McDermott	O'Connor Twp.	3	149
5. Hicks Option	Noranda Exploration Co. Ltd.	Burchell Lake Area	4	321
6. Cal-Chris Property	Lincoln Resources Inc.	Hagey Twp.	3	473
7. Ray Smith Prospect	GLE Resources Ltd.	Haines Twp.	4	327
8. Moss Project	Matt Berry Mines Ltd.	Moss Twp.	9	1,234
9. Snodgrass Lake Property	Tandem Resources Ltd. Storimin Exploration Ltd. Joint venture	Moss Twp.	2	340
10. Golden Winner Property	Golden Winner Resources Ltd.	Red Paint Lake Area	3	343
11. Dawson Road Lots Property	Lynx-Canada Explorations Ltd.	Dawson Road Lots	5	426
12. Saganaga Lake Property	Curran Bay Resources Ltd.	North Shore Saganaga Lake	23	1,212

THUNDER BAY AREA

A total of 7 476 m of diamond-drill core was collected from 12 properties in the Thunder Bay area, and stored at the Thunder Bay Drill Core Library. Table 4.4 summarizes the 1987 collection. Selected drill core sections from two properties were examined in detail.

Gold Creek Property (Duckworth Township)

In February 1985, Anaconda Canada Exploration Limited completed a 13-hole diamond-drill program, totaling 1158 m, on their Gold Creek Property. The 107-claim group is located southeast of Shebandowan Lake, approximately 61 km northwest of the City of Thunder Bay. During this period, the property was under option from Jalna Resources Limited. The following is summarized from the Assessment Files, Resident Geologist's Office, Thunder Bay.

The diamond drilling program was designed to test a highly sheared quartz-sericite schist containing 1 to 2 percent pyrite, in a grey-green, quartz-eye crystal tuff sequence where anomalous gold values had been obtained from previous surface sampling. Five mineralized surface zones were identified by Jalna Resources Limited (1984), and much of Anaconda's work concentrated in what is known as the North Zone. The area host rock consists of bedded, intermediate tuff to finely banded, felsic tuff containing variable pyrite of up to three percent. Also present are volcanic breccia units up tc 15 m in width, characterized by stretched mafic and felsic tuff fragments (from 2 to 5 cm, and up to 10 cm, in length), and chert-banded tuffs. Primary alteration associated with the mottled, dark-grey, quartz-sericite schist target unit consists of moderate to intense silicification and sericitization. Core samples from within this unit, assayed by Anaconda Canada Exploration Limited, identified gold values of up to 4.1 g/t.

Moss Project (Moss Township)

Matt Berry Mines Limited completed a nine-hole, 1234-foot diamond-drill program on their 12-claim group in March 1987. The property is located adjacent to the old Huronian, or Moss, Mine off the Hermia Lake Road in Moss Township, approximately 110 km due west of Thunder Bay.

Two exposed quartz vein zones, known as the north and south veins, were targeted for drilling. These quartz veins, which are up to 1.5 m wide, were intersected in two drillholes. They exhibit a crack-seal texture containing calcite, occasional tourmaline, and chlorite-sericite in fractures. Up to five percent pyrite occurs within the quartz veins, concentrated along fractures and at the vein margins.

The area host rock consists of fine-grained, dark-green, mafic to intermediate metavolcanic tuff, containing less than one percent disseminated pyrite, locally altered to a highly fissile, chlorite-talc schist. Local pyritization of up to five percent is both disseminated, and concentrated in fractures. This unit displays zones of intercalated mafic tuff and magnetic, chert-banded iron formation (from 0.75 to 1.8 m wide), containing up to 10 percent pyrite, pyrrhotite, and chalcopyrite as disseminations, stringers, and blebs. In addition, thick sequences (up to 52 m) of fragmental tuff, containing zones of felsic volcanic breccia, make up part of this unit. Individual fragments within the tuff range from 1 to 3 cm in size, and comprise 10 to 15 percent of the rock.

TABLE 4.5. MAPS AND REPORTS PERTAINING TO THE THUNDER BAY DISTRICT, PUBLISHED DURING 1987 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports

OFR 5634
OFR 5636
OFR 5642
OFR 5644
OFR 5645
OFR 5646
OFR 5655
OFR 5656
OFR 5657
OFR 5669
OFR 5671

Open File Maps

OFM 73
OFM 82
OFM 99

Preliminary Maps

P.3082
P.3083
P.3094

Coloured Maps

2065
2518
2485

Miscellaneous Papers

MP 134
MP 136
MP 137

Mineral Resources Branch Publications

MPBP 23
MPBP 24

Mineral Deposit Circulars

MDC 26

The felsic volcanic brecciated zones, ranging from 1.0 to 5.0 m wide, host stretched feldspar porphyry and quartz-sericite schist fragments up to 9.0 cm long. Some fragments exhibit strong hematization. This brecciated zone is related to sections of mineralized quartz-eye feldspar porphyry (from 1 to 35 m thick) which locally exhibits moderate to intense hematization. Targeting these hematized zones for geochemical analysis may prove to be of economic interest. Disseminated pyrite, in amounts from one to three percent, occurs within this porphyritic unit, and is often associated with quartz-calcite stringers, which are prominent throughout.

Geochemical analysis of the diamond-drill core has not been released to date.

GEOLOGICAL RESEARCH IN THE THUNDER BAY AREA

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Details of the research carried out by the Ontario Geological Survey (OGS) is given in Colvine *et al.* (in press). Maps and reports pertaining to the Thunder Bay district, published during 1987, are listed in Table 4.5. A summary of programs by the Precambrian Geology Section of the Ontario Geological Survey is listed below:

M. Carter: Synoptic mapping in the Shebandowan area, dealing with the Timiskaming question.

P. Thurston: Regional mapping in the Garden Lake and Heaven Lake area.

A.R. Smith and R. Sutcliffe: Mapping of the Crystal Lake area, Pardee Township.

A.R. Smith: Mapping of the Ste. Ignace Island and Moss Lake mafic intrusions.

J. Macdonald and G. Lawson: Geology and mineralization of the Lac des Iles intrusive.

GEOLOGICAL SURVEY OF CANADA

H. Poulson, I. Derome and R. Brommecker: Structural mapping in the Wild Potato Lake-Seine River area.

LAKEHEAD UNIVERSITY ACTIVITIES (partial list)

Staff

P. Fralick: Nature of Timiskaming-type sedimentation.

S. Kissin: Ontario Geoscience Grant to study the silver mineralization in the Thunder Bay area; University Research Incentive Fund (URIF) grant to study amethyst at the Thunder Bay Amethyst Mine Panorama.

Students

C. Alford: Experimental shear strain and magnetic fabrics (M.Sc.).

S.T. Burgess: The Silver Mountain Mines, Thunder Bay (H.B.Sc).

D. Cullen: Metamorphic study of the Quetico metasediments near Atikokan (H.B.Sc.).

J.A. McArthur: Fluid Inclusions at the Thunder Bay Amethyst Mine Panorama (H.B.Sc.).

A. MacTavish: Petrology and mineralization of the Atikokan mafic intrusions (M.Sc.).

J. Newby: Structural mapping, Gorham Township (H.B.Sc).

P. Sarvas: Structure and Magnetic Fabric of Quetico Metasediments near Atikokan (M.Sc.).

R. Sherlock: Studies of the Shuniah and Thunder Bay Mines (M.Sc.).

OTHER UNIVERSITIES

E. Cogula: Petrology of the Crystal Lake gabbro, Pardee Township, University of Ottawa, Ottawa.

D. Davis: Uranium/Lead age dating in the Fort Francis to Atikokan area (Geological Survey of Canada, COMDA Contract. This project is part of the Canada-Ontario Mineral Development Agreement (COMDA), which is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario).

L. Diamond and G. Skippen: Alteration associated with gold mineralization in the Mine Centre and Atikokan area; Carleton University, Ottawa (Geological Survey of Canada, COMDA Contract).

G. Dunning: Uranium/lead age dating in the Lake Shebandowan area. Royal Ontario Museum, Toronto.

E. Linhardt: Petrology of the northern Lac des Iles intrusion, University of Munich, Munich, Federal Republic of Germany.

J. McDoughal: Petrology of the Tibb Lake mafic intrusion, University of Western Ontario, London.

E. McLellan: NASA-Goddard Study of the Relationship between Vegetation and Geology using Remote Sensing Methods, University of Maryland at College Park, College Park, Maryland.

I. Nesbit: Geology of the Steep Rock Iron Mine, University of Saskatoon, Saskatoon.

F. Puzutto: Sedimentology of the Quetico metasediment, University of Minnesota at Duluth, Duluth, Minnesota.

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5. Beardmore–Geraldton Resident Geologist's Area—1987

J. K. Mason[1], C. M. Hine[2], A. A. Speed[2], G. D. White[3], F. J. Kristjansson[4], L. H. Thorleifson[5]

[1] Resident Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[2] Staff Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[3] Thunder Bay Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[4] Geologist, Engineering and Terrain Section, Ontario Geological Survey, Toronto

[5] Research Scientist, Terrain Sciences Section, Geological Survey of Canada, Ottawa

INTRODUCTION

Effective January 1, 1987, the Thunder Bay Mining Division was subdivided into the following Resident Geologist's districts: the Beardmore–Geraldton district, the Schreiber–Hemlo district, and the Thunder Bay district. The Beardmore–Geraldton district is outlined on Figure 5.1, and includes the communities of Beardmore, Jellicoe, Geraldton, Longlac, Nakina, Fort Hope, and Landsdowne House.

Staff of the Beardmore–Geraldton district program includes: J. K. Mason, Resident Geologist; C. M. Hine, Staff Geologist; A. Mansfield, Secretary (Contract); and A. A. Speed, Historical Research Project which was funded by the Canada-Ontario Mineral Development Agreement (COMDA), which is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario.

ACKNOWLEDGMENTS

The Thunder Bay Drill Core Library portion of the report was written by Gerry White. Alan Speed wrote the Historical Research (COMDA) section. F.J. ("Rik") Kristjansson and L. Harvey Thorleifson wrote the Quaternary section. Editing was provided by K.G. Fenwick (Manager, Northwestern Region, Ministry of Northern Development and Mines, Thunder Bay) and P. Perry (Resource Geologist, Ministry of Northern Development and Mines, Thunder Bay). Compilation and typing was provided by S. Koski (Clerk Typist), A. Mansfield, and P. Perry.

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

The Beardmore–Geraldton Resident Geologist's staff experienced a busy initial year, providing consultation and information to prospectors, consultants and mining company geologists engaged in mineral exploration. Property visits, field trips, geology talks, and seminars were undertaken.

The Beardmore–Geraldton area (Wabigoon Subprovince) and the Fort Hope–Miminiska Lake area (Uchi Subprovince) were both very active, almost exclusively for gold exploration.

Geology and exploration talks were given to the following: Small Scale Mining Seminar, Thunder Bay Geoscience Seminar, Geraldton Chamber of Commerce, Geraldton Interagency Committee, Geraldton Town Council, Junior Rangers, and Summer Beaver Settlement. Displays were presented at the Small Scale Mining Seminar, the Toronto and Thunder Bay Geoscience Seminars, and the Geraldton Fiftieth Anniversary Celebrations.

Five major field trips were given in the Beardmore–Geraldton area. Field offices were established and staffed on a part-time basis in Geraldton, at the Ministry of Northern Development and Mines Office, and at the the Beardmore Municipal Office.

A municipal tour was conducted for the Reeve of Nakina and mayors of Longlac and Geraldton. Reserve Number 77 (Longlac) and Reserve Number 64 (Fort Hope) representatives consulted with the Resident Geologist's Staff. Geological exploration data were submitted for a number of land and planning issues including the Little Jackfish Hydro Project and Geraldton Annexation.

Staff attended the Prospectors and Developers Convention, Toronto; the McGill Small Scale Mining Seminar, Montreal; a Flow-thru Share and Mine Financing Seminar, Toronto; and Exploration '87, Toronto.

PRODUCING MINES AND MAJOR EXPLORATION PROGRAMS

BEARDMORE–GERALDTON AREA

The Greenoaks Mine, located in Pifher-Elmhirst Townships, produced 156 tons of gold-silver-copper ore from the No. 2 vein in 1987. The ore was milled at the Canadian Concentrator's Mill, Thunder Bay. Mill heads assayed up to 0.5 ounce gold per ton and concentrate assayed up to 111.2 ounces gold per ton (Bill Miron, Canadian Concentrators, Thunder Bay, personal communication, 1987).

Pat Culhane (Prospector, Geraldton) has installed a 40 ton-per-day gold mill at the MacLeod-Cockshutt Mine site. The mill produces gold concentrate from mine or mill cleanup material salvaged from the previous MacLeod-Cockshutt mill. The MacLeod-Cockshutt Mine produced 1.48 million ounces of gold between 1938 and 1968 (Mason and McConnell 1983). Mill-head assays for millfeed are up to 4.0 ounces gold per ton.

Ateba Mines Incorporated have installed an ore-sorting machine, renovated the Pan-Empire Mill, and are processing mine waste from the Leitch and Northern Empire dumps. The first gold pour was made in December 1987.

Duration Mines Limited–Locator Explorations Limited initiated a multiphase exploration program on the Theresa Gold Mine, south of Longlac. Line cutting, geophysics, shaft dewatering and rehabilitation,

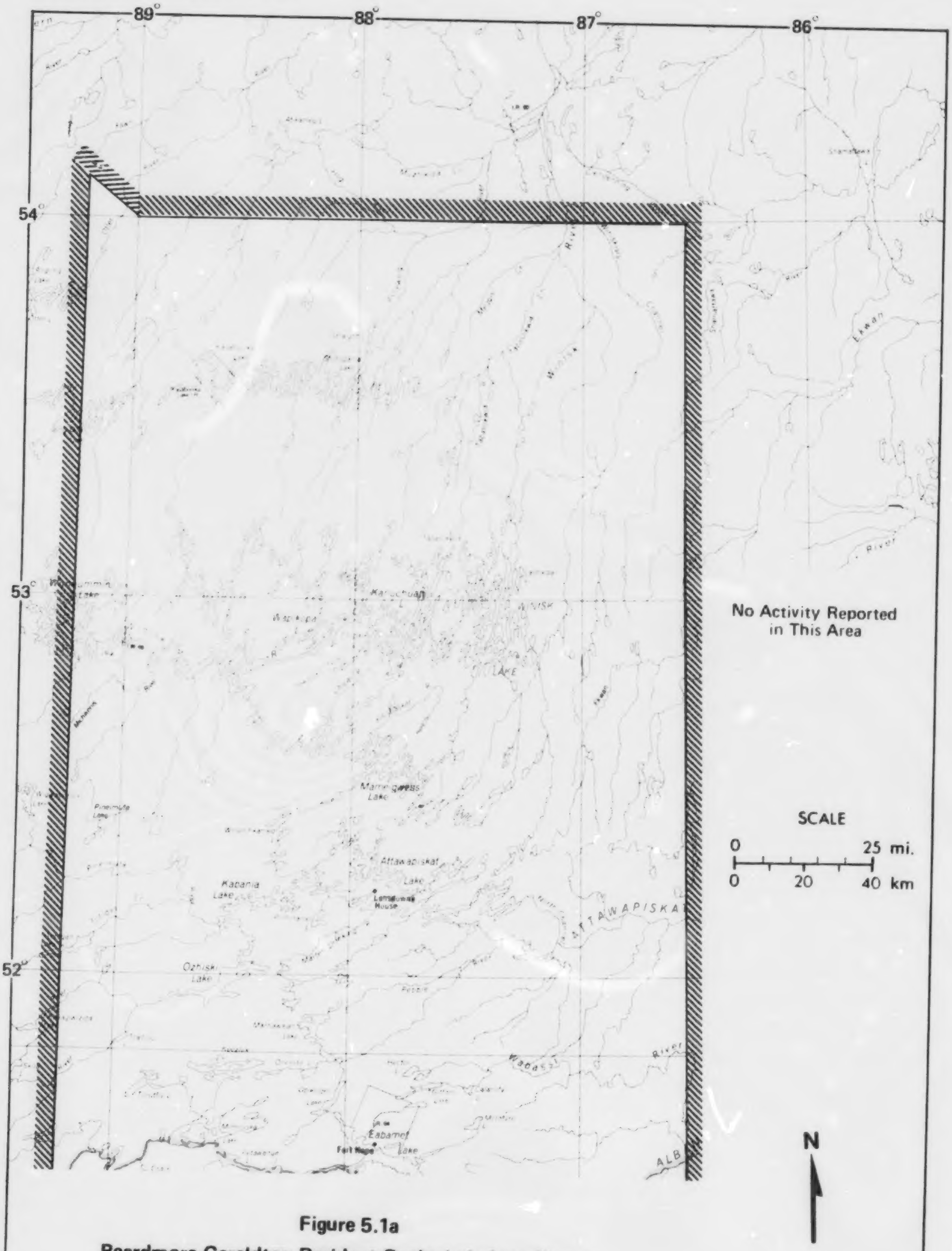
89°
88°
87°
86°
54°
53°
52°
Winisk River
Ekwan
River
Kapiichuan
Wapikopa Lake
WINISK
LAKE
Mameigwess Lake
Pineimuta Lake
Attawapiskat Lake
Kabania Lake
Lansdowne House
ATTAWAPISKAT
Ozhiski Lake
Wabassi
River
Eabamet
Fort Hope
Lake
ALB
No Activity Reported in This Area
SCALE
0
25 mi.
0
20
40 km
N

Figure 5.1a

Beardmore-Geraldton Resident Geologist's Area Figure

Adjoins Figure 5.1b

Fig. 5.1a & b

EXPLANATION

◆ PROPERTY VISITS 1987

1. ANGLE LAKE PROPERTY – E. Rentz
2. BANANA LAKE PROPERTY – (B. Mehaffey)
3. BANKFIELD MINE
   (Noranda Exploration Company Limited)
4. BRINKLOW OCCURRENCE
5. BROOKBANK PROSPECT
   (Hudson Bay Gold Inc. – Metalore Resources)
6. F. BYRON PROPERTY
7. CHOWDER LAKE PROSPECT
   (Golden Tiger Mining Exploration Company Inc.)
8. CONSOLIDATED MOSHER MINE
   (Lac Minerals Limited)
9. CROOKED GREEN CREEK #1 ZONE
   (Sweany Gold Corporation)
10. CROOKED GREEN CREEK #2
    (Parklane Technologies Inc.)
11. EVA LAKE PROPERTY (E. Rutherford)
12. FERNOW LAKE OCCURRENCE
    (Kelmet Resources Limited)
13. F. GAGNON OCCURRENCE
14. HUTCHISON LAKE MINE (Royal Oak Resources)
15. KOWKASH RIVER PROPERTY (F. Byron Property)
16. LEWKOSKI OCCURRENCE
17. MACLEOD-COCKSHUTT MINE
    (Lac Minerals Limited)
18. MAGNET CONSOLIDATED MINE
    (Roxmark Mines Limited-Ateba Mines Inc.)
19. MURIEL LAKE OCCURRENCE (D. Downey)
20. NORTHERN EMPIRE MINE (Ateba Mines Limited)
21. PICHETTE OCCURRENCE
22. SANDY CREEK OCCURRENCE
    (Panthco Resources Inc.)
23. THERESA GOLD MINE (Duration Mines Limited – Locator Explorations Ltd.)
24. TREPTOW LAKE OCCURRENCE (T. Head)

Fig. 5.1a & b

EXPLANATION

◆ PROPERTY VISITS

LOCATION OF OGS FIELD PARTIES IN 1987

A. GEOLOGY OF THE NORTHERN LONG LAC AREA
B. QUARTERNARY GEOLOGY AND GOLD EXPLORATION IN THE BEARDMORE-GERALDTON AREA (COMDA)
C. STRUCTURAL STUDIES IN THE BEARDMORE-GERALDTON BELT AND IN THE QUETICO AND WAWA SUB-PROVINCES

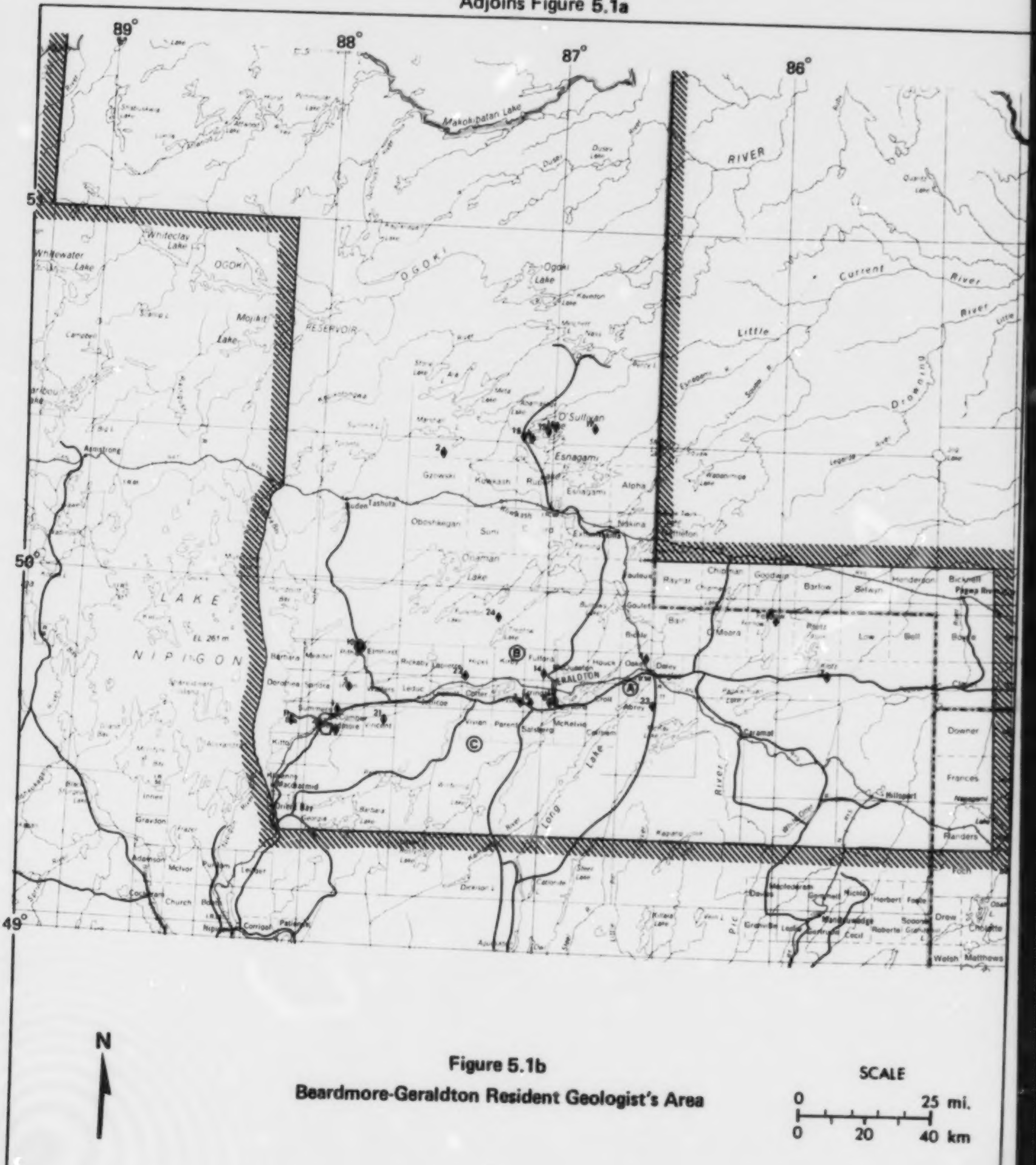
Adjoins Figure 5.1a
89°
88°
87°
86°
51°
50°
49°
Makokibatan Lake
RIVER
OGOKI
RESERVOIR
Whiteclay Lake
Whitewater Lake
Mojikit Lake
Ogoki Lake
O'Sullivan
Esnagami
Current
River
Little
Drowning
Armstrong
Tashota
Nakina
Onaman Lake
LAKE
NIPIGON
EL 261 m
GERALDTON
Long Lake
Caramat
Kitto
Orient Bay
Nipigon
Church
Corrigal
Adamson
McIvor
Gravdon
Downer
Frances
Flanders
Foch
Drew
Welsh
Matthews
A
B
C
N
SCALE
0
25 mi.
0
20
40 km

Figure 5.1b
Beardmore-Geraldton Resident Geologist's Area

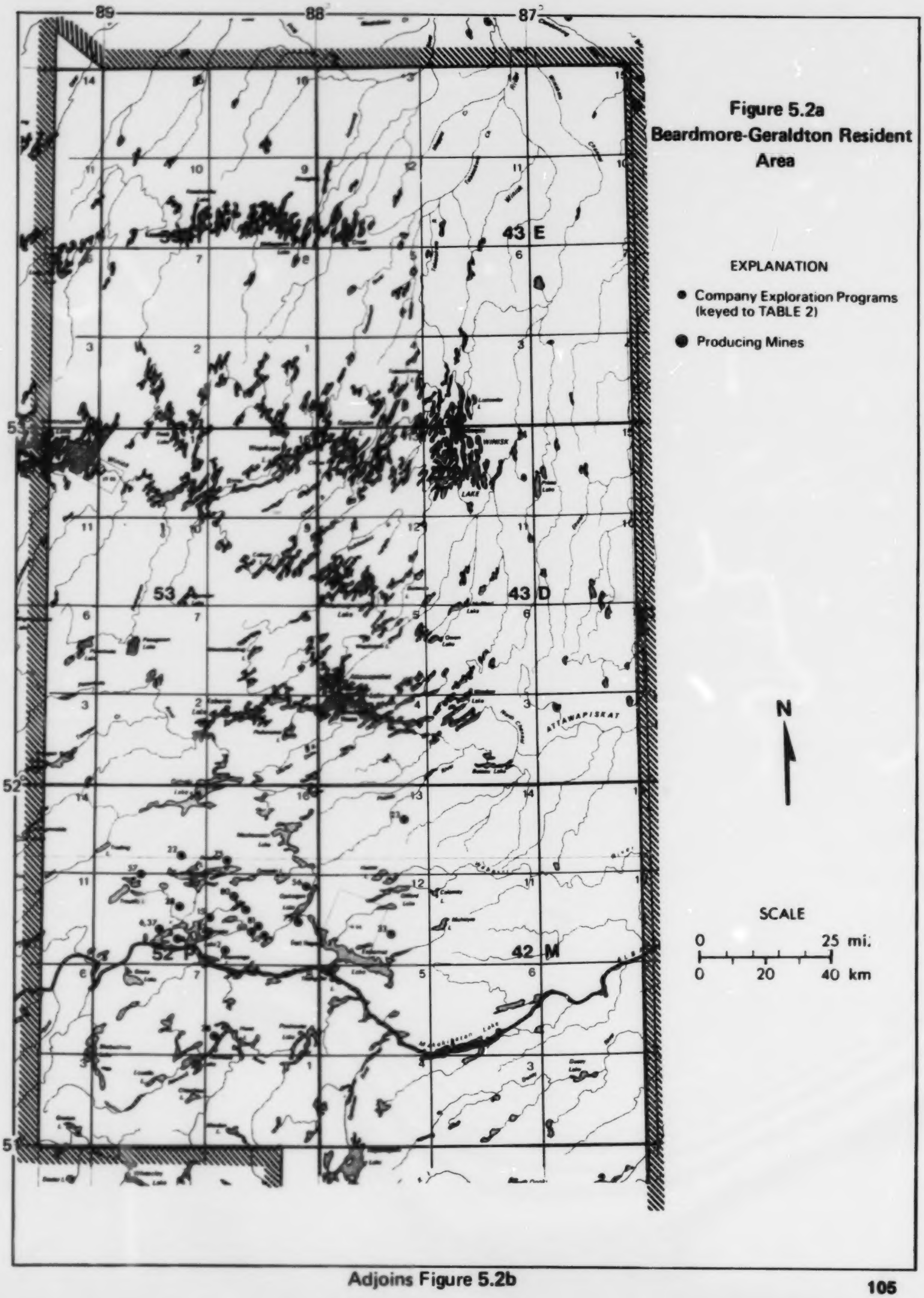
89
88
87
53
52
51
43 E
43 D
53 A
52 P
42 M
WINISK
LAKE
ATTAWAPISKAT
EXPLANATION
● Company Exploration Programs (keyed to TABLE 2)
● Producing Mines
N
SCALE
0 25 mi.
0 20 40 km

Figure 5.2a
Beardmore-Geraldton Resident Area

Adjoins Figure 5.2b

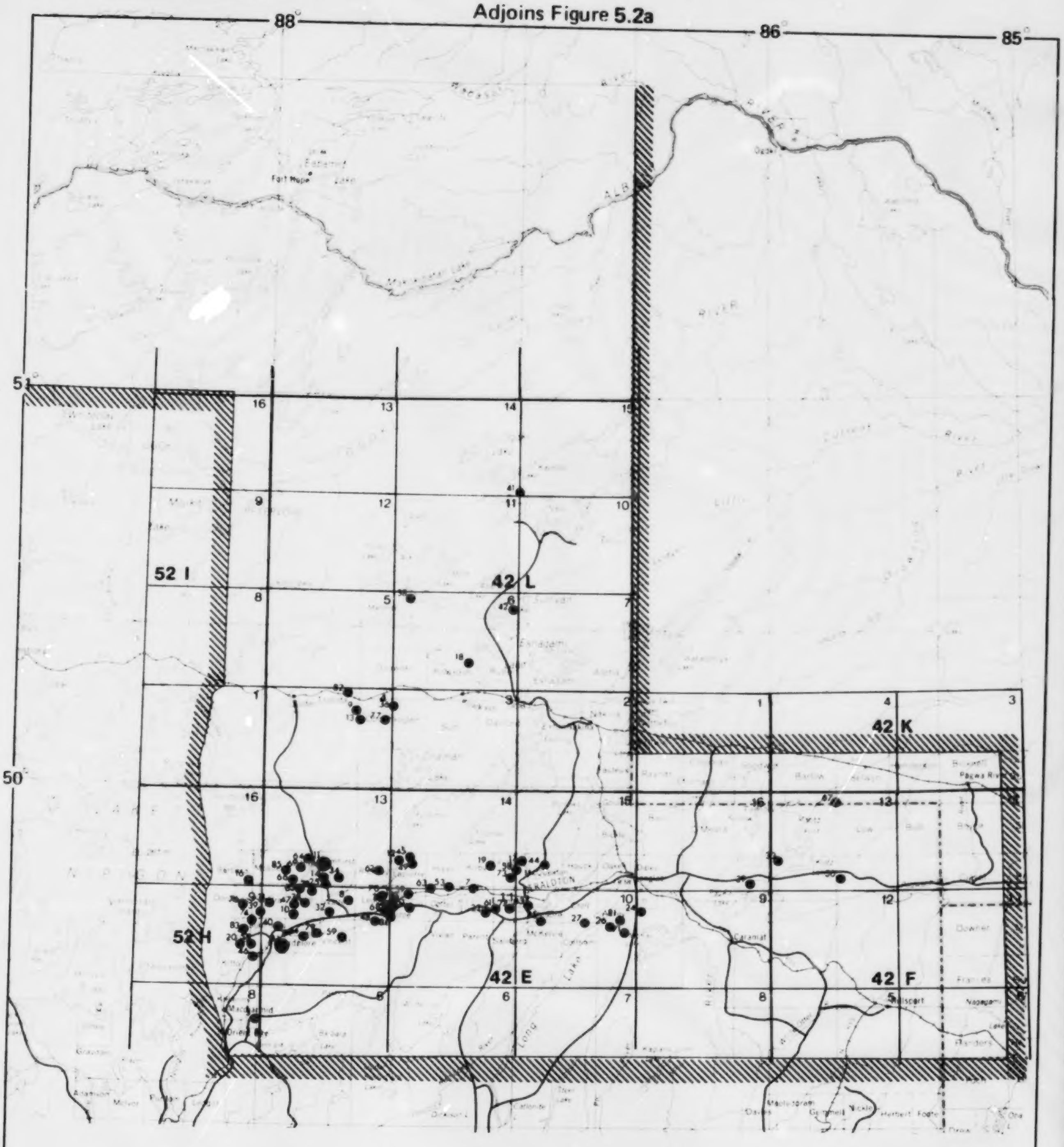
Adjoins Figure 5.2a
88°
86°
85°
51°
50°
52 I
52 H
42 L
42 K
42 E
42 F
GERALDTON
N

Figure 5.2b

Beardmore-Geraldton Resident Geologist's Area

SCALE
0
25 mi.
0
20
40 km

surface diamond drilling, underground diamond drilling, sampling, and geological mapping (surface and underground) were undertaken.

Roxmark Mines Limited–Ateba Mines Incorporated continued with an advanced exploration program on the Magnet Consolidated Gold Mine project, west of Geraldton. An exploratory headframe, hoist, and electrical substation have been installed. Surface diamond drilling has been completed.

Hardrock Extension Incorporated–Ferau Resources Incorporated and Geraldton Longlac Gold Incorporated conducted exploration programs on their extensive holdings and gold occurrences south and southeast of Geraldton.

Hudson Bay Gold Incorporated continued with a diamond-drill program on Metalore Resources Limited's Brookbank Property in Irwin Township.

Lac Minerals Limited conducted an exploration program on their Geraldton area properties including 4500 m (15 000 feet) of drilling, a geological mapping survey, and geophysical surveys, specifically, magnetometer, VLF, and IP surveys.

Coulson Exploration Incorporated undertook a program of geological mapping, prospecting, sampling, and geophysics on their extensive claim holdings in the Beardmore–Geraldton area.

Parklane Technologies Incorporated conducted exploration programs on the Spooner Gold Mine, the Crooked Green (No. 2 Zone) Creek Mine, and Sandra Township Properties.

Sweany Gold Corporation–Nodaden Resources Ltd. continued with year two, of multiphase exploration programs in the Beardmore area on the Cowan Occurrence, the Hopkins-Brengold Occurrences and the Crooked Green (No. 1 Zone) Creek Mine.

Teck Corporation–San Paulo Explorations Incorporated initiated an extensive drill program on the Leitch Gold Mine Property.

Cryderman Gold continued with a multiphase exploration program on the Sand River Gold Mine Property.

FORT HOPE

The Fort Hope area (eastern Uchi Subprovince) was the site of intensive exploration programs for gold mineralization. Major participants included Baroque Resources Limited–Homestake Mineral Development Company, B.P. Canada Inc., Cominco Limited, Dome Exploration (Canada) Limited, Gold Fields Canadian Mining Limited, Goldpost Resources Incorporated, Noranda Exploration Company Limited, Noramco Explorations Incorporated (Pure Gold Resources Incorporated–Severide Resources Incorporated), Mirandore Exploration Incorporated, and Tandem Resources Limited.

CLAIM STAKING

Claim-staking data and assessment work credit for the entire Thunder Bay Mining Division is given by Patterson *et al.* (this volume).

BEARDMORE–GERALDTON AREA

GENERAL GEOLOGY AND STRUCTURE

The geology of the Beardmore–Geraldton area's portion of the Wabigoon Subprovince, has been divided into two belts: a) the Beardmore–Geraldton Belt, and b) the Onaman–Tashota Metavolcanic Belt. The belts are separated by the Paint Lake Fault, a major transcurrent fault.

The Beardmore–Geraldton Belt is situated within an east-trending, isoclinally folded, metavolcanic-metasedimentary sequence. Lithologic units have been transposed into a series of alternating slices of metavolcanics and metasediments within a wrench fault or megashear zone. The Beardmore–Geraldton Belt has been divided lithologically into: a) the Southern Metavolcanic Sub-belt and b) the Southern Metasedimentary Sub-belt.

The Onaman–Tashota Metavolcanic Belt is a felsic to mafic calc-alkalic and tholeiitic metavolcanic sequence bounded to the south by the Paint Lake Fault.

A detailed description of the geology and gold mineralization of the Beardmore–Geraldton Belt and Onaman–Tashota Metavolcanic Belt is provided in Mason and White (1986) and by Mason and White in Patterson *et al.* (1984, 1985).

GOLD DEPOSITS: BEARDMORE–GERALDTON BELT

Roxmark Mines Limited–Ateba Mines Incorporated

Roxmark Mines Limited–Ateba Mines Incorporated continued exploration on the Magnet Consolidated Mine, located 8 km west of Geraldton. The property consists of 94 unpatented mining claims in Errington Township.

The Magnet Consolidated Mine produced 152 089 ounces of gold at a grade of 0.42 ounce gold per ton and 16 879 ounces of silver from 1938 to 1952 (Mason and McConnell 1983).

To date, geological, and drill-indicated reserves of 944 000 tons at a grade of 0.17 ounce gold per ton are present in five zones on the property: a) Magnet Vein, b) Footwall Vein, c) Intermediate Vein, d) Wells Vein, and e) North and Benedict Zones (Ateba Mines Incorporated Annual Report 1986).

During 1987, a surface diamond-drill program was undertaken on the Benedict Zone, located north of the Magnet shaft. An exploratory headframe has been erected and an electrical substation installed to permit dewatering. The mine workings consist of the main shaft and a winze; the latter is collared on the 1730 foot (527 m) level and developed to 2640 feet (805 m). Dewatering will permit resampling, remapping, and underground diamond drilling to prove gold ore reserves in the lower sections of the mine. Two hoists have been installed to service the mine for exploration. Bulk samples will be tested at Ateba Mine Incorporated's Pan-Empire Mill, Beardmore, Ontario.

TABLE 5.1 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

A-Airborne Survey
AEM-Airborne Electromagnetic Survey
A Mag-Airborne Magnetometer Survey
Assess-Assessment Work
DD-Diamond Drilling (where shown the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively)
DR-Drilling Report
EM-Electromagnetic Survey
Geochem-Geochemical Survey
GL-Geological Survey
Grad-Gradiometer Survey
HLEM-Horizontal Loop Electromagnetic Survey

IP-Induced Polarization
Mag-Magnetometer Survey
Man Work-Manual Work
Mech Work-Mechanical Work
MS-Mine Sections
OMEP-Ontario Mineral Exploration Program
Pet-Petrographic Studies
PR-Property Report
Rad-Radiometric Survey
Res-Resistivity Survey
(r)-Rock
(S)-Soil
SA-Sampling, Assays
SP-Self Potential
STr-Power Stripping
Tr-Trenching

UG-Underground Work
VLF-Very Low Frequency

Au-Gold
Cu-Copper
Li-Lithium
Ni-Nickel

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Legault Twp. (G-170)	42E11/NW	1. Accord Resources Inc.	Au	Assess	DD 4-1901.1 m, SA	1986, 1987	-	
Frond Lake (G-252), Miminiska Lake (G-332), Opikeigan Lake (G-361), Rich Lake (G-388)	52P9/SW, 52P10/SE, 52P9/NE/SE	2. Agassiz Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1987	2.10267	
Fernow Twp. (G-468)	42E16/NE	3. Albert, Onesime	Au	Assess	Mech Work	1986	-	
Castlewood Lake (G-22)	42E13/NE	4. Andaurex Resources Inc. (Conglomerate Lake Area-Project #28010)	Au	Assess	AEM, VLF, A Mag	1986	2.9405	
Leduc Twp. (G-169)	42E12/NE	5. Ark Energy Ltd. (Watts, H.)(Houghton, F.)(Koski, J.)(McNicoll, B.)	Au	Assess	A Rad, A Mag	1986	2.9615	
Pijitawabik Bay (G-111)	52H8/NE	6. Armeno Resources Inc. (Noranda-McVitte Property)	Li	Assess	DD 2-150 m	1987	-	
McComber Twp. (G-166)	42E12/NW	7a. Ateba Mines Inc. (Tenacity Mining Corp./ Norben Gold Resources Inc. Option)	Au	Assess	GL	1987	2.10231	
Lindsley Twp. (G-483)	42E11/NE	7b. Ateba Mines Inc. (Leliever, Bob) (Fournier, Georges)	Au	Assess	AEM, VLF, A Mag	1987	2.10447	
Miminiska Lake (G-332)	52P10/SE	8a. BP Resources Canada Ltd. (Selco Division)	Au	Assess	DD 3-250.84 m, SA	1985	-	
Miminiska Lake (G-332)	52P10/SE	8b. BP Resources Canada Ltd. (Selco Division) (Miminiska Project)	Au	Assess	Geochem (S), SA	1986	2.10006	
Miminiska Lake (G-332)	52P10/SE	8c. BP Resources Canada Ltd. (Selco Division)	Au	Assess	Res, IP	1987	2.10007	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lapierre Lake (G-65), Rickaby Twp. (G-161)	42E14/SW, 42E13/SE	9a. Blue Falcon Mines Ltd. (Larche, V.) (Collins, R.) (Korpela, D.) (Leliever, R.)	Au	Assess	A Rad, A Mag	1986	2.9801	
Rickaby Twp. (G-161), Lapierre Lake (G-65)	42E14/SW	9b. Blue Falcon Mines Ltd. (675534 Ont. Ltd.) (Weirmeir, A.)	Au	Assess	A Rad, A Mag	1986	2.9804	
Summers Twp. (G-165)	42E12/NW	10a. Boos, B. (Ternowesky, J.)	Au	Assess	Geochem, EM, Mag, SA	1986	2.9480	
Summers Twp. (G-165)	42E12/NW	10b. Boos, B. (Akhurst, William Kent)	Au	Assess	STr	1987	-	
Daley Twp. (G-482), Oakes Twp./Longlac Area (G-307)	42E15/SE	11. Brinklow, William	Au	Assess	Mech Work	1986, 1987	-	
Ashmore Twp. (G-472), Croll Twp. (G-491)	42E10/NW	12a. Brugger, P./ McNicoll, B.	Au	Assess	AEM, VLF, A Mag	1987	2.10323	
Colter Twp. (G-477), Lindsley Twp. (G-483)	42E11/NW/ NE	12b. Brugger, P. (McNicoll, B.)	Au	Assess	AEM, VLF, A Mag	1987	2.9992	
Metcalfe Lake (G-84)	42L4/NE	13a. Callisto Minerals Inc.	Au	Assess	VLF	1986	2.9650	
Metcalfe Lake (G-84)	42L4/NE	13b. Callisto Minerals Inc.	Au	Assess	Rad	1986	2.9651	
Metcalfe Lake (G-84)	42L4/NE	13c. Callisto Minerals Inc.	Au	Assess	Rad, EM	1986	2.9552	
Metcalfe Lake (G-84)	42L4/NE	13d. Callisto Minerals Inc.	Au	Assess	SA	1986	2.9681	
Metcalfe Lake (G-84)	42L4/NE	13e. Callisto Minerals Inc.	Au	Assess	SA	1986	2.9698	
Metcalfe Lake (G-84)	42L4/NE	13f. Callisto Minerals Inc.	Au	Assess	Pet, SA	1986	2.9848	
Metcalfe Lake (G-84)	42L4/NE	13g. Callisto Minerals Inc.	Au	Assess	SA	1987	2.10269	
Metcalfe Lake (G-84)	42L4/NE	13h. Callisto Minerals Inc.	Au	Assess	Geochem	1987	2.10270	
Oboshkegan Twp. (G-173)	42L4/NE	13i. Callisto Minerals Inc.	Au	Assess	SA	1986	2.9569	
Irwin Twp. (G-164)	42E12/NW	14. Calnor Resources Ltd. (Cowan, M.) (Windigokan Lake Claims)	Au	Assess	VLF	1987	2.10063	
Leduc Twp. (G-169), Walters Twp. (G-171), Legault Twp. (G-170)	42E12/NE, 42E11/NW	15a. Canadian Gold Resources Inc.	Au	Assess	A Rad, A Mag	1986	2.9624	
Rickaby Twp. (G-161), Elmhirst Twp. (G-162), Leduc Twp. (G-169), Walters Twp. (G-171), Legault Twp. (G-170), Irwin Twp. (G-164)	42E13/SE, 42E12/NE 42E11/NW, 42E12/NW	15b. Canadian Gold Resources Ltd.	Au	Assess	A Rad, A Mag	1986	2.9803	
Metcalfe Lake (G-84), Oboshkegan Twp. (G-173)	42L4/NE	16. Caribbean Resources Corp. (Callisto Minerals Inc.) (Yzerdraat, W.)	Au	Assess	AEM, VLF, A Mag	1987	2.10422	
Ashmore Twp. (G-472)	42E10/NW	17a. Cayuga Syndicate (Docherty, B.)	Au	Assess	GL, VLF, Mag	1986	2.9619	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Elmhirst Twp. (G-162)	42E13/SE	17b. Cayuga Syndicate (Docherty, B.)	Au	Assess	GL, VLF, Mag	1986	2.9620	
Vincent Twp. (G-163)	42E12/NE	17c. Cayuga Syndicate (Docherty, B.)	Au	Assess	Geochem, GL, VLF, Mag, SA	1986	2.9546	
Walters Twp. (G-171)	42E12/NE/NW	17d. Cayuga Syndicate (Docherty, B.)	Au	Assess	Geochem (S), GL, VLF, Mag, SA	1986	2.9545	
Hipel Twp./Lapierre Lake (G-65)	42E14/SW	18. Checkley, F.	Au	Assess	STr	1987	-	
Miminiska Lake (G-332), Nesting Lake (G-342), Ferguson Lake (G-249), Frond Lake (G-252)	52P10/SE/NE, 52P9/NW/SW	19. Cominco Ltd. (Niska Prop.)	Au	Assess	VLF, HLEM, Mag	1987	2.9978	
O'Sullivan Lake (G-362), Main Lake (G-179)	42L6/NE, 42L7/NW	20. Consolidated Louanna Gold Mines Prop. (Calbane Property) (Lacana Mining Corp.)	Au	OMEP	UG-DD 34-4713.6 m, PR, GL, VLF, Mag, DD 18-1972.2 m, MS, SA	1984	63.4520	
Barbara Twp./Meader Twp. (G-168)	52H16/SE	21. Coulson Explor. Inc. (Peplinski, Mike)	Au	Assess	AEM, VLF, A Mag	1987	2.10317	
Irwin Twp. (G-164)	42E12/NW	22a. Cowan, M. F. (Windigokan Lake Prop.)	Au	Assess	SA	1986	2.10042	
Irwin Twp. (G-164)	42E12/NW	22b. Cowan, M. F.	Au	Assess	STr	1987	-	
Irwin Twp. (G-164)	42E12/NW	22c. Cowan, M. F. (Nordic Lake Claims)	Au	Assess	STr	1987	-	
Sandra Twp. (G-167)	42E12/NW	22d. Cowan, M. F. (Gunnar Gold Inc./Nodaden Resources) (Cyril Knight (Sandra Twp.) Occurrence)	Au	Assess	DD 2-185.4 m, SA	1987	-	
Tyrol Lake (G-141)	42E13/SW	22e. Cowan, M. F. (Maloney-Sturgeon Prospect)	Au	Assess	GL	1986	2.9957	
Walters Twp. (G-171)	42E12/NE	22f. Cowan, M. F. (Nissiamkikan Creek Claims)	Au	Assess	STr	1987	-	
Tyrol Lake (G-141)	42E13/SW	23. Cox, William L.	Au	Assess	STr	1986	-	
Pickett Twp. (G-161)	42E13/SE	24. Daimler Resources Inc.	Au	Assess	A Rad, A Mag	1986	2.9800	
Leduc Twp. (G-169)	42E12/NE	25. Diplomat Resources Ltd. (Watts, H.) (Koski, J.)	Au	Assess	A Rad, A Mag	1986	2.9613	
McBean Lake (G-321)	42E10/NE	26a. Discovery Mines Ltd. (Discovery West Corp.) (Long Lake Project)	Au	Assess	HLEM, Mag	1987	2.10036	
McBean Lake (G-321)	42E10/NE	26b. Discovery Mines Ltd. (Discovery West Corp.)	Au	Assess	AEM, VLF, A Mag	1987	2.10214	
Falcon Lake (G-35)	52I8/NE	27a. Dome Explor. (Canada) Ltd. (Project 309)	Au	Assess	HLEM, Mag	1987	2.10286	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Keezhik Lake (East Arm) (G-288), Keezhik Lake (North Bay) (G-347)	52P16/SW, 52P15/SE	27b. Dome Explor. (Canada) Ltd.	Au	Assess	AEM, VLF, A Mag	1986	2.9520	
Keezhik Lake (North Bay) (G-347)	52P15/SE	27c. Dome Explor. (Canada) Ltd.	Au	Assess	DD 1-152 m	1987	-	
Talbot Lake (G-426)	52P15/SW	27d. Dome Explor. (Canada) Ltd. (Project 232B)	Au	Assess	HLEM, Mag, VLF	1986	2.9521	
Talbot Lake (G-426)	52P15/SW	27e. Dome Explor. (Canada) Ltd.	Au	Assess	DD 4-496.5 m	1987	-	
Walters Twp. (G-171), Leduc Twp. (G-169)	42E12/NE	27f. Dome Explor. (Canada) Ltd. (Project 144D)	Au	Assess	DD 1-122 m	1986	-	
Norton Lake (G-355)	42M14/NW	28. Duration Resources Ltd. (Wasabi Resources Ltd.) (Joutel Resources Ltd.)	Au	Assess	AEM, VLF, A Mag	1986	2.9846	
Sandra Twp. (G-167)	42E12/NW, 52H9/NE	29. Edda Resources Inc. (664429 Ont. Inc.) (Parres, Jim) (Goldhunter Explors. Inc.)	Au	Assess	AEM, VLF, A Mag	1986	2.10055	
Elmhirst Twp. (G-162)	42E13/SE	30. Elmhirst Lake Syndicate (Grant, John)	Au	OMEP	PR	1984	63.4411	
Elmhirst Twp. (G-162), Walters Twp. (G-171), Tyrol Lake (G-141)	42E13/SE, 42E12/NE, 42E13/SW	31. Elmhirst Syndicate (McAlpine, C.) (Taylor, M. J.) (Gladu, A.) (Koski, J.)	Au	Assess	A Rad, A Mag	1986	2.9629	
Wapitotem Lake (G-447), Springer Lake (G-413), Bartman Lake (G-202), Mameigwess Lake (G-316), Owen Lake (G-364)	43D5/NW/NE, 43D12/SE/SW, 43D6/SW	32. Forester Resources Inc. (Landsdowne Project)	Au	OMEP	GL, EM, Mag, SA	1985	63.4568	
Barbara Twp./Mungo Park Point (G-92)	52H16/SE	33. Freewest Resources Inc.	Au	Assess	AEM, VLF, A Mag	1986	2.10099	
Klotz Lake (G-295), Castlebar Lake (G-220)	42F13/SW, 42E16/SE	34a. Getty Canadian Metals Ltd.	Au	Assess	DR, DD 9-1534 m, SA	1986	-	
Klotz Lake (G-295)	42F13/SW	34b. Getty Canadian Metals Ltd.	Au	Assess	PR, VLF, Mag, SA	1987	2.9779	
Klotz Lake (G-295), Bicknell Lake (G-206), Kassagimini Lake (G-286), Eeger Lake (G-232), Pagwachuan Lake (G-368), Castlebar Lake (G-220), Lukinto Lake (G-312), Laponen Lake (G-300), McBean Lake (G-321)	42F13/SW/SE, 42F12/NW/NE, 42E9/NE, 42E16/SE/SW, 42E9/NW, 42E10/NE	34c. Getty Canadian Metals Ltd.	Au	OMEP	PR, DR, GL, IP, EM, AEM, A Mag, Mag	1984	63.4457	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ferguson Lake (G-249), Frond Lake (G-252), Miminiska Lake (G-332), Nesting Lake (G-342)	52P9/NW/SW, 52P10/SE/NE	35a. Gold Fields Canadian Mining Ltd.	Au	Assess	AEM, VLF, A Mag	1986	2.9606	
Ferguson Lake (G-249), Hurst/Felsia Lakes (G-272)	52P9/NW, 52P8/SW	35b. Gold Fields Canadian Mining Ltd.	Au	Assess	AEM, VLF, A Mag	1987	2.10261	
Miminiska Lake (G-332)	52P10/SE	35c. Gold Fields Canadian Mining Ltd.	Au	Assess	DD 1-200.3 m	1987	-	
Nesting Lake (G-342), Keezhik Lake (North Bay) (G-347)	52P10/NE, 52P15/SE	35d. Gold Fields Canadian Mining Ltd.	Au	Assess	AEM, VLF, A Mag	1986	2.9604	
Petawanga Lake (G-378)	52P8/NW	35e. Gold Fields Canadian Mining Ltd.	Au	Assess	AEM, VLF A Mag	1986	2.9263	
Schist Lake (G-395)	42M5/SE	35f. Gold Fields Canadian Mining Ltd. (Hoey Syndicate Claims)	Au	Assess	SA	1986	2.10350	
Pagwachuan Lake (G-368)	42E9/NE	36a. Golden Rock Explors. Inc. (Teck Prop.) (Ward-Morrow (Bellex) Occ.)	Au	Assess	DR, DD 10-322.5 m, SA, VLF/Mag - Maps only	1987	-	
Pagwachuan Lake (G-368)	42E9/NE	36b. Golden Rock Explors. Inc. (Westover, Ross Vernon) (Kenogamisis Property)	Au	Assess	DR, DD 3-301.2 m, SA, VLF/Mag - Maps only	1987	-	
Castlebar Lake (G-220)	42E16/SE	37. Golden Tiger Mining Explor. Co. Inc. (Gabbro Lake Property)	Au	OMEP	Tr, SA, Mag	1985	63.4657	
Sandra Twp. (G-167)	52H9/NE, 42E12/NW	38. Goldhunter Explors. Inc. (Parres, Jim)	Au	Assess	AEM, VLF, A Mag	1987	2.10230	
Walters Twp. (G-171)	42E12/NW/NE	39. Goldhurst Resources Inc.	Au	Assess	VLF, Mag	1986	2.9721	
Veekay Lake (G-440)	42M12/SE	40. Goldpost Resources Inc.	Au	Assess	Res, AEM, VLF, A Mag	1986	2.9881	
Elmhirst Twp. (G-162)	42E13/SE	41. Goldteck Mines Ltd. (Greater Temagami Mines Ltd.) (Auger, Tony) (Wilkinson Lake Prop.)	Au	Assess	VLF, Mag	1987	2.10162	
Oboshkegan Twp. (G-173)	42L4/NE	42. Harte Resources Ltd.	Au	Assess	Res, IP, VLF, Mag, SA	1986	2.9403	
Sandra Twp. (G-167)	42E12/NW	43. Hibbard, M.	Au	Assess	AEM, VLF, A Mag	1986	2.9608	
Oboshkegan Twp. (G-173)	42L4/NE	44. Holmer Gold Mines Ltd. (Claim Group 'A', 'C', 'D'-Tashota Prop.)	Au	Assess	GL, VLF, Mag	1986	2.9662	
Meader Twp. (G-168)	42E13/SW	45. Holmwood Resources Ltd. (Parquet Resources Inc.)	Au	Assess	DD 1-200 m, SA	1986	-	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Miminiska Lake (G-332)	52P10/SE	46. Homestake Mineral Develop. Co.	Au	Assess	DD 20-2491.2 m, SA	1986, 1987	-	
Castlewood Lake (G-22)	42E13/NE	47a. Hudson Bay Explor. & Develop. Co. Ltd. (Grasser Lake Claims)	Au	Assess	Geochem, VLF	1986	2.9888	
Colter Twp. (G-477)	42E11/NW	47b. Hudson Bay Explor. & Develop. Co. Ltd.	Au	Assess	DD 3-310.5 m, SA	1986	-	
Colter Twp. (G-477)	42E11/NW	47c. Hudson Bay Explor. & Develop. Co. Ltd.	Au	Assess	SA	1986	2.9914	
Lake Jean (G-64)	42E5/NW	47d. Hudson Bay Explor. & Develop. Co. Ltd.	Au	Assess	VLF	1986	2.9591	
Lapierre Lake/ Hipel Twp. (G-65), Treptow Lake/Kirby Twp. (G-434)	42E14/SW/ SE	47e. Hudson Bay Explor. & Develop. Co. Ltd. (Dumus Lake Claims)	Au	Assess	Geochem, SA, VLF, Mag	1986	2.9429	
Legault Twp. (G-170)	42E11/NW	47f. Hudson Bay Explor. & Develop. Co. Ltd. (Partridge Lake Project)	Au	Assess	DD 6-204.7 m, SA	1986	-	
Legault Twp. (G-170)	42E11/NW	47g. Hudson Bay Explor. & Develop. Co. Ltd. (Partridge Lake Project)	Au	Assess	SA	1986	2.9673	
Sandra Twp. (G-167)	42E12/NW	48. Jamie Frontier Resources Inc. (Mid North Engineering Services Ltd.)	Au	Assess	PR, AEM, VLF, A Mag	1986	2.9677	
Summers Twp. (G-165), Elmhirst Twp. (G-162)	42E12/NW, 42E13/SE	49. Jet Mining Explor. Inc. (Belisle, O.) (Rentz, E.) (Rickaby Occ.)	Au	Assess	AEM, VLF, A Mag	1987	2.10125	
Elmhirst Twp. (G-162), Rickaby Twp. (G-161)	42E13/SE	50. Karvinen, W. O. (Wilkinson Lake Property)	Au	Assess	VLF, Mag	1987	2.9810	
Rich Lake (G-388)	52P9/SE	51a. Kerr Addison Mines Ltd.	Au	Assess	DD 2-62.14 m, SA	1986	-	
Speckled Trout Rapids (G-412), Ogoki Lake (G-357)	42L15/SW, 42L14/SE	51b. Kerr Addison Mines Ltd. (Melchett Lake Property)	Au	Assess	DR, DD 6-1129.28 m, SA	1987	-	
Speckled Trout Rapids (G-412), Durer Lake (G-228), Ogoki Lake (G-357), Tennant Lake (G-428)	42L15/SW, 42L10/NW, 42L14/SE, 42L11/NE	51c. Kerr Addison Mines Ltd. (Melchett Lake Property)	Au	Assess	Geochem (r), SA	1987	2.10217	
Speckled Trout Rapids (G-412), Durer Lake (G-228), Ogoki Lake (G-357), Tennant Lake (G-428)	42L15/SW, 42L10/NW, 42L14/SE, 42L11/NE	51d. Kerr Addison Mines Ltd. (Melchett Lake Property)	Au	Assess	SA	1987	2.10218	
Rickaby Twp. (G-161)	42E13/SE	52. Kidd Resources Ltd.	Au	Assess	A Rad, A Mag	1986	2.9802	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Alfred Lake/ McQuesten Twp. (G-189)	42E15/SW	53. Lacana Explor. (1981) Inc. (Burrows Property)	Au	Assess	VLF, Mag	1987	2.10197	
Lapierre Lake (G-65)	42E14/SW	54. Leatherberry Syndicate (Koski, John) (Clarke, Richard L.) (Fournier, George)	Au	Assess	A Mag, A Rad	1987	2.10407	
Summers Twp. (G-165), Maryjane Lake (G-80)	42E12/SW, 52H9/SE	55. Legion Resources Ltd. (Vatri, B.) (Longbeard Property) (Buffalo Beardmore Prospect)	Au	Assess	Geochem, SA	1987	2.10093	
Dorothea Twp./ Poplar Point (G-116)	52H9/NE	56. Leliever, Robert (Larche, V.)	Au	Assess	AEM, VLF, A Mag	1987	2.10235	
Vincent Twp. (G-163)	42E12/NE	57a. Maki, Neil R.	Au	OMEP	PR, SA	1984	63.4437	
Vincent Twp. (G-163)	42E12/NE	57b. Maki, Neil R. (Maki Occ.) (Noranda Exploration Co. Ltd.)	Au	Assess	SA	1986	2.9736	
Vincent Twp. (G-163)	42E12/NE	57c. Maki, Neil R. (Maki Occ.) (Noranda Exploration Co. Ltd.)	Au	Assess	STr	1986	-	
Ashmore Twp. (G-472), McKelvie Twp. (G-484)	42E10/NW	58a. Malouf, M. (Ashmore Gold Mines Prop.) (Hardrock Extension Property)	Au	OMEP	STr	1984	63.4540	
Ashmore Twp. (G-472), McKelvie Twp. (G-484)	42E10/NW	58b. Malouf, M. (Hardrock Extension Property) (Ashmore Gold Mines Property)	Au	Assess	DD 3-837 m	1986	-	
Coltham Twp. (G-481), Croll Twp. (G-491), McKelvie Twp. (G-484)	42E10/NW/ NE	58c. Malouf, M. (Geraldton Longlac Gold Inc.)	Au	Assess	EM, Mag	1987	2.9882	
McBean Lake (G-321), Coltham Twp. (G-481)	42E10/NE	58d. Malouf, M.	Au	Assess	STr	1986	-	
McBean Lake (G-321), Coltham Twp. (G-481)	42E10/NE	58e. Malouf, M. (Geraldton Longlac Gold Inc.) (Ferau Resources Inc.)	Au	Assess	STr	1986	-	
McBean Lake (G-321) McKelvie Twp. (G-484)	42E10/NE/ NW	58f. Malouf, M. (Hardrock Extension Inc.) (Ferau Resources Inc.)	Au	Assess	DD 14-1430.5 m, SA	1987	-	
McBean Lake (G-321), McKelvie Twp. (G-484)	42E10/NE/ NW	58g. Malouf, M. (Hardrock Extension Inc.) (Ferau Resources Inc.)	Au	Assess	DD 6-716.86 m	1987	-	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McKelive Twp. (G-484), Ashmore Twp. (G-472)	42E10/NW	58h. Malouf, M. (Hardrock Extension Inc.)	Au	Assess	EM, Mag	1987	2.9883	
Elmhirst Twp. (G-162)	42E13/SE	59a. Markle, David	Au	Assess	AEM, VLF, A Mag	1987	2.10030	
Elmhirst Twp. (G-162)	42E13/SE	59b. Markle, David	Au	Assess	AEM, VLF, A Mag	1987	2.10031	
Elmhirst Twp. (G-162)	42E13/SE	60. Maruska, E.	Au	Assess	AEM, VLF, A Mag	1987	2.10328	
Errington Twp. (G-479)	42E11/NW	61. McChristie, Wayne/ Culhane, Pat	Au	Assess	STr	1987	-	
Elmhirst Twp. (G-162)	42E13/SE	62a. Mealey, G. L./ Skalesky, P.	Au	Assess	AEM, VLF, A Mag	1987	2.10284	
McComber Twp. (G-166), Summers Twp. (G-165)	42E12/SW	62b. Mealey, G. L./ Skalesky, P.	Au	Assess	AEM, VLF, A Mag	1987	2.10282	
Tyrol Lake (G-141)	42E13/SW	62c. Mealey, G. L. (Mealey, Patricia Gail)	Au	Assess	AEM, VLF, A Mag	1987	2.10283	
Legault Twp. (G-170), South of Legault Twp. (G-131)	42E11/NW	63. Mealey, Patricia Gail/ Koivisto, Ray J.	Au	Assess	AEM, VLF, A Mag	1987	2.10253	
Irwin Twp. (G-164)	42E12/NW	64a. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 1-58.9 m, SA	1984, 1986	2.9264	
Irwin Twp. (G-164)	42E12/NW	64b. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 10-836.1 m, SA	1985, 1986	-	
Irwin Twp. (G-164)	42E12/NW	64c. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 4-245.4 m	1986	-	
Irwin Twp. (G-164)	42E12/NW	64d. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 2-259.7 m	1986, 1987	-	
Leduc Twp. (G-169)	42E12/NE	64e. Metalore Resources Ltd. (Cowan, M.)	Au	Assess	A Rad, A Mag	1986	2.9731	
Walters Twp. (G-171), Leduc Twp. (G-169)	42E12/NE	64f. Metalore Resources Ltd. (Nabigon, J.) (Canady, B.) (Lance, C.) (Bourdignon)	Au	Assess	A Rad, A Mag	1986	2.9487	
Legault Twp. (G-170), Colter Twp. (G-477), Leduc Twp. (G-169)	42E11/NW/ NE, 42E12/NE	65a. Mid North Engineering Services Ltd. (Project No. 28G27)	Au	Assess	AEM, VLF, A Mag	1986	2.10044	
McBean Lake (G-321)	42E10/NE	65b. Mid North Engineering Services Ltd. (Conscot Resources Ltd.)	Au	Assess	Geochem, SA	1986	2.9762	
Leduc Twp. (G-169)	42E12/NE	66a. Mingold Resources Inc. (Leduc Option)	Au	Assess	DD 1-45.63 m, SA	1987	-	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Leduc Twp. (G-169)	42E12/NE	66b. Mingold Resources Inc. (Leduc Option)	Au	Assess	DD 1-32.8 m, SA	1987	-	
Leduc Twp. (G-169)	42E12/NE, 42E11/NW	66c. Mingold Resources Inc. (Leduc Option Claims)	Au	Assess	STr	1987	-	
Legault Twp. (G-170)	42E11/NW	66d. Mingold Resources Inc. (Hudson Bay Explor. & Develop. Co. Ltd.) (Partridge Lake Property)	Au	Assess	AEM, VLF, A Mag	1987	2.10383	
Tyrol Lake (G-141)	42E13/SW	67. Mitto, A.	Au	Assess	AEM, VLF, A Mag	1987	2.10329	
Lapierre Lake (G-65)	42E14/SW	68a. Monte Carlo Gold Mines Ltd. (Leliever, R.) (Collins, R.)	Au	Assess	A Rad, A Mag	1986	2.9805	
Lapierre Lake/Hipel Twp. (G-65)	42E14/SW	68b. Monte Carlo Gold Mines Ltd. (Kidd Resources Ltd.) (Daimler Resources Inc.)	Au	Assess	DD 10-2372.96 m	1987	-	
Vivian Twp. (G-471)	42E11/NW	69. Morrison, Murray	Au	Assess	Mag	1987	2.9979	
Leduc Twp. (G-169)	42E12/NE	70. Mugor Resources Ltd.	Au	Assess	A Rad, A Mag	1986	2.9614	
Lapierre Lake/Hipel Twp. (G-65), Colter Twp. (G-477)	42E14/SW, 42E11/NW	71. Ben Nelson Ltd. (Nelson, Bernhard)	Au	Assess	AEM, VLF, A Mag	1987	2.10290	
Lapierre Lake/Hipel Twp. (G-65)	42E14/SW	72a. Nelson, B. I.	Au	Assess	SP	1986	2.9661	
Leduc Twp. (G-169)	42E12/NE	72b. Nelson, B. I.	Au	Assess	Mag	1987	2.10137	
Frond Lake (G-252)	52P9/SW	73a. Noranda Exploration Co. Ltd./ Exploration Mirandor	Au	Assess	AEM, VLF A Mag	1987	2.10266	
Oboshkegan Twp. (G-173)	42L4/NE	73b. Noranda Exploration Co. Ltd. (Oboshkegan Lake Claim Group)	Au	Assess	GL	1986	2.9453	
South of Legault Twp. (G131), Legault Twp. (G-170), Leduc Twp. (G-169)	42E11/NW	73c. Noranda Exploration Co. Ltd. (Lattimer Prospect)	Au	Assess	Grad, VLF, Mag	1987	2.10010	
Treptow Lake/Kirby Twp.(G-434), Alfred Lake/McQuesten Twp. (G-189)	42E14/SE, 42E15/SW	73d. Noranda Exploration Co. Ltd.	Au	Assess	Geochem, SA	1986	2.9990	
Treptow Lake/Kirby Twp. (G-434), Alfred Lake/McQuesten Twp. (G-189)	42E14/SE 42E15/SW	73e. Noranda Exploration Co. Ltd. (Fulford Property)	Au	Assess	VLF, Mag	1987	2.10143	
Tyrol Lake/Pifher Twp. (G-141), Irwin Twp. (G-164), Sandra Twp. (G-167)	42E13/SW, 42E12/NW	73f. Noranda Exploration Co. Ltd. (Atlantic/ Twin Falls Property)	Au	Assess	GL	1986	2.9533	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Vincent Twp. (G-163)	42E12/NE	73g. Noranda Exploration Co. Ltd. (Maki Option)	Au	Assess	Rad, VLF, Mag, GL - Map only	1987	2.9934	
McComber Twp. (G-166), Vincent Twp. (G-163), Summers Twp. (G-165)	42E12/NW/NE/SE	74. Norben Gold Resources Ltd. (PanContinental Mining (Can.) Ltd.) (Tenacity Mining Corp. Ltd.) (Pan Empire Project) (Kondrat Showing) (Ralph Lake (Delbridge/Blacksmith/Dominion) Occurrence)	Au	Assess	GL, SA	1986	2.9929	
Tyrol Lake (G-141)	42E13/SW	75. Northern Concentrators Ltd. (Cowan Gold Property)	Au	Assess	SA	1986	2.9514	
Walters Twp. (G-171)	42E12/NE	76a. Novak, Neil (Blue Falcon Mines Ltd.)	Au	Assess	VLF, Mag	1987	2.10199	
Walters Twp. (G-171)	42E12/NE	76b. Novak, Neil	Au	Assess	GL, Tr, SA	1987	2.10382	
Rickaby Twp. (G-161)	42E13/SE, 42E14/SW	77. Orofino Resources Ltd.	Au	Assess	A Rad, A Mag	1986	2.9909	
Meader Twp. (G-168), Sandra Twp. (G-167)	42E13/SW, 42E12/NW	78. Parquet Resources Inc. (Holmwood Resources Ltd.)	Au	Assess	AEM, VLF, A Mag	1986	2.9815	
Meader Twp. (G-168), Tyrol Lake/Pifher Twp. (G-141), Sandra Twp. (G-167)	42E13/SW, 42E12/NW	79a. Peddle Lake Mining Corp. (Baarts, A.) (Skalesky, P.) (Ternowesky, J.)	Au	Assess	VLF, Mag, DD 3-910 m, SA	1986	2.9476	
Meader Twp. (G-168), Tyrol Lake/Pifher Twp. (G-141)	42E13/SW	79b. Peddle Lake Mining Corp. (Baarts, A.) (Skalesky, P.) (Ternowesky, J.)	Au	Assess	GL	1986	2.10163	
Tyrol Lake/Pifher Twp. (G-141)	42E13/SW	79c. Peddle Lake Mining Corp. (Baarts, A.) (Skalesky, P.) (Ternowesky, J.)	Au	Assess	STr	1986	-	
McComber Twp. (G-166), Irwin Twp. (G-164)	42E12/NW	80a. Pettit, C.	Au	Assess	AEM, VLF, A Mag	1986	2.9580	
Vincent Twp. (G-163), Walters Twp. (G-171)	42E12/NE	80b. Pettit, C.	Au	Assess	STr	1986	-	
Sandra Twp. (G-167)	42E13/SW	81a. Podany Mining Corp. (Atlantic/Twin Falls Option)	Au	Assess	DD 1-98.0 m	1986	-	
Tyrol Lake/Pifher Twp. (G-141), Irwin Twp. (G-164)	42E13/SW, 42E12/NW	81b. Podany Mining Corp. (Atlantic/Twin Falls Option) (Skalesky, P.)	Au	Assess	DD 3-438 m	1986	-	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Sandra Twp. (G-167)	42E12/NW, 52H9/NE	82. Portfield Industries Inc. (663635 Ontario Ltd.)	Au	Assess	AEM, VLF, A Mag	1986	2.9526	
O'Sullivan Lake (G-362)	42L6/NE	83. Prendergast, J. B. (O'Sullivan Lake Gold Prospect)	Au	Assess	DD 7-609.7 m, SA	1986	-	
Tyrol Lake/Pifher Twp. (G-141)	42E13/SW	84. Pudifin, A. D. (Cox, L.) (Beaurebard, A.)	Au	Assess	AEM, VLF, A Mag	1987	2.10327	
Keezhik Lake (East Arm) (G-288)	52P16/SW	85a. Pure Gold Resources Inc. (Cadman Lake Property)	Au	Assess	AEM, VLF, A Mag	1986	2.9709	
Keezhik Lake (East Arm) (G-288)	52P16/SW	85b. Pure Gold Resources Inc. (Keezhik Lake Property)	Au	Assess	AEM, VLF, A Mag	1986	2.9708	
Keezhik Lake (East Arm) (G-288)	52P16/SW	85c. Pure Gold Resources Inc. (Severide Resources Ltd.) (Hinzer Option) (Keezhik Lake Property)	Au	Assess	DD 17-3537.81 m, SA	1986, 1987	-	
Keezhik Lake (East Arm) (G-288)	52P16/SW	85d. Pure Gold Resources Inc. (Cadman Prop.)	Au	Assess	DD 7-1064.93 m, SA	1987	-	
Opikeigan Lake (G-361), Rich Lake (G-388)	52P9/NE/ SE	85e. Pure Gold Resources Inc. (Opikeigan Lake Property)	Au	Assess	AEM, VLF, A Mag	1986	2.9707	
Opikeigan Lake (G-361), Rich Lake (G-388)	52P9/NE/ SE	85f. Pure Gold Resources Inc. (Opikeigan Lake Property)	Au	Assess	DD 6-325.63 m, SA	1987	-	
Irwin Twp. (G-164), Tyrol Lake/Pifher Twp. (G-141), Elmhirst Twp. (G-162)	42E12/NW, 42E13/SW	86a. Quebec Sturgeon River Gold Mines (Phoenix Gold Mines Ltd.)	Au	OMEP	Geochem, GL, EM, Mag, SA, Tr, DD 15-1926.5 m	1984	63.4548	
Irwin Twp. (G-164), Tyrol Lake/Pifher Twp. (G-141), Elmhirst Twp. (G-162)	42E12/NW, 42E13/SW	86b. Quebec Sturgeon River Gold Mines (Phoenix Gold Mines Ltd.)	Au	OMEP	Geochem, GL, EM, Mag, SA, DD 1-183.43 m	1985	63.4613	
Legault Twp. (G-170), Leduc Twp. (G-169)	42E11/NW	87. Rampart Resources Ltd. (Mid North Engineering Services Ltd.)	Au	Assess	DD 9-1358.64 m, SA	1987	-	
Rich Lake (G-388)	52P9/SE	88a. Reid, James (Rond Lake Property)	Au	Assess	Mech Work, SA, DD 4-156.7 m	1986	-	
Rich Lake (G-388)	52P9/SE	88b. Reid, James (Rond Lake Property)	Au	Assess	SA	1986	2.9578	
Elmhirst Twp. (G-162), Rickaby Twp. (G-161)	42E13/SE	89. Rosenblatt, A./ Shack, A. G.	Au	Assess	A Rad, A Mag	1986	2.9574	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Errington Twp. (G-479)	42E11/NE	90. Roxmark Mines Ltd. (Magnet Consolidated Mines Prop.)	Au	Assess	DD 3-813.33 m, SA	1986	-	
Dorothea Twp./ Poplar Point (G-116), Sandra Twp. (G-167), Summers Twp. (G-165), Irwin Twp. (G-164), Eva Twp./ Kitto Twp./Maryjane Lake (G-80)	52H9/NE, 42E12/NW, 52H9/SE	91a. San Paulo Explorations Inc. (Borowitski, G.)(Jacob, D.) (Noel, R.) (Coulson, M.) (Pelletier, P.)	Au	Assess	AEM, VLF, A Mag	1987	2.10121	
Dorothea Twp./ Poplar Point (G-116), Summers Twp. (G-165), Sandra Twp. (G-167)	52H9/NE, 42E12/NW	91b. San Paulo Explorations Inc.	Au	Assess	HLEM, Mag	1987	2.10119	
Gzowski Twp. (G-182)	42L5/SE	92. Sanfacon, Olymoe	Au	Assess	Man Work, Mech Work	1987	-	
Leduc Twp. (G-169)	42E12/NE	93. Seven Mile High Resources Inc. (Morrison, Murray) (Oxaline Lake Property)	Au	Assess	GL	1986	2.9835	
Dorothea Twp./Poplar Point (G-116), Sandra Twp. (G-167)	52H9/NE	94. Shango Resources Ltd. (Korba, Edward)	Au	Assess	AEM, VLF, A Mag	1987	2.10172	
Oboshkegan Twp. (G-173)	42L4/NE	95a. Sherritt Gordon Mines Ltd. (Knappett, R.) (Knucklethumb Lake Claims)	Au	Assess	VLF, Mag	1986	2.9420	
Oboshkegan Twp. (G-173)	42L4/NE	95b. Sherritt Gordon Mines Ltd. (Knappett, R.) (Knucklethumb Lake Claims)	Au	Assess	DD 1-170.1 m, SA	1987	-	
O'Sullivan Lake (G-362)	42L6/NE	96. Sutherland, W. D. (O'Sullivan Lake Gold Property)	Au	Assess	SA	1986	2.10074	
Coughlan Lake (G-26)	42L4/SE	97. TJN Gold Explor. Inc. (Hopkins Option)	Au	OMEP	Tr, GL, EM, Mag, SA, DD 5-304.2 m	1984	63.4558	
McComber Twp. (G-166)	42E12/NW	98a. Tenacity Mining Corp. Ltd.	Au	Assess	STr	1985	-	
McComber Twp. (G-166)	42E12/NW	98b. Tenacity Mining Corp. Ltd. (Ralph Lake (Blacksmith/ Delbridge/ Dominion) Occurrence)	Au	Assess	Mech Work, Man Work, DD 1-102.41 m	1986	-	
McComber Twp. (G-166)	42E12/NW	98c. Tenacity Mining Corp. Ltd. (Ralph Lake (Blacksmith/ Delbridge/ Dominion) Occurrence)	Au	Assess	DD 4-598 m	1987	-	

TABLE 5.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McComber Twp. (G-166)	42E12/NW	98d. Tenacity Mining Corp. Ltd. (Ralph Lake (Blacksmith/ Delbridge/ Dominion) Occurrence)	Au	Assess	STr	1987	-	
McComber Twp. (G-166)	42E12/NW	98e. Tenacity Mining Corp. Ltd.	Au	Assess	DD 9-1561.8 m	1987	-	
Summers Twp. (G-165)	42E12/SW	99. Thorsteinson, D.	Au	Assess	VLF, SA	1986	2.9693	
Ashmore Twp. (G-472)	42E10/NW	100. Tomson, Evald	Au	Assess	GL, VLF, Mag	1987	2.9904	
Klotz Lake (G-295)	42F13/SW	101a. Transway Explors. Inc. (Mid North Engineering Services Ltd.)	Au	Assess	DD 4-434 m, SA	1984	-	
Klotz Lake (G-295)	42F13/SW	101b. Transway Explors. Inc.	Au	OMEP	DR	1985	63.4526	
Tyrol Lake/Pifher Twp. (G-141), Meader Twp. (G-168)	42E13/SW	102. Tyrol Lake Project (Baarts, A.)	Au	Assess	AEM, VLF, A Mag	1987	2.9877	
Metcalfe Lake (G-84)	42L4/NE	103a. Yzerdraat, W.	Au	OMEP	Geochem	1983	63.4277	
Metcalfe Lake (G-84)	42L4/NE	103b. Yzerdraat, W.	Au	OMEP	Geochem	1983	63.4399	
Bartman Lake (G-202), Springer Lake (G-413)	43D12/SE, 43D5/NE	104. Weaco Resources Ltd.	Au, Cu, Ni	Assess	EM, Mag	1984	2.8297	
Opikeigan Lake (G-361)	52P9/NE	105. Westfield Minerals Ltd.	Au	Assess	AEM, VLF, A Mag	1986	2.9510	

The Magnet Consolidated Mine Property is underlain by the Southern Metasedimentary Sub-belt, which consists of clastic metasediments including conglomerate, greywacke, slate, and iron formation. Diorite, diorite porphyry, albite porphyry, and diabase intrude the metasediments.

Pye (1951) documented the structure of the property:

> "The Bankfield–Tombill Fault Zone crosses the Magnet Property at a point 1150 feet south of the main shaft. It strikes N75°W, roughly parallel to several vein zones and dips 70°S. As elsewhere, it is a highly silicified and carbonatized zone, varying in width on the Magnet Property from 50 to over 100 feet... In the underground workings, several important, and numerous minor, post ore faults cut and offset the ore zones. The most significant of these is the Magnet Fault which is now a highly silicified breccia zone varying in width from a few feet to over 50 feet. It strikes N 68 degrees E, dips 30-35 degrees NW."

Roxmark Mines Limited-Ateba Mines Incorporated are exploring the Magnet Fault to develop gold ore.

Pye (1951) described the Magnet Consolidated Mine mineralization:

> "The ore bodies at the Magnet Mine consist chiefly of quartz with small amounts of carbonate and subordinate sulphides. The metallic constituents, which seldom constitute more than 5 per cent of the ore, are in order of paragenesis; arsenopyrite, pyrite, pyrrhotite, sphalerite, galena and gold."

Surface diamond drilling undertaken during 1987 on the Benedict Zone, located north of the Magnet shaft, gave the following drill results:

Hole	Intersection	Assay (oz gold/ton)
R87-4	4.0 m (13.3 feet)	0.34
R87-5	4.2 m (14.0 feet)	0.14
R87-15	1.4 m (4.5 feet)	0.45
R87-15	1.8 m (6.1 feet)	0.61
R87-16	5.6 m (18.5 feet)	0.105

(Vernon Shein, Mine Geologist, A.C.A. Howe International, Geraldton, personal communication 1987).

Duration Mines Limited–Locator Explorations Limited

Duration Mines Limited–Locator Explorations Limited initiated a multiphase exploration program on the Theresa Gold Mine, located 10 km south of Longlac. The Theresa Gold Mine produced 4785 ounces of gold at a grade of 0.18 ounce gold per ton from 1935 to 1955 (Mason and McConnell 1983). During 1987, rehabilitation of underground workings was completed, including shaft dewatering on the No. 3 shaft to 300 m and hoist installation. Underground sampling, mapping, and diamond drilling have been completed.

The Theresa Mine area is underlain by mafic metavolcanics and minor metasediments intruded by massive quartz diorite to granodiorite to diorite stocks. The diorite contains up to 30 percent ferromagnesian minerals with erratic biotite to hornblende ratios. Pendants of metavolcanics can be noted in the granodiorite. All units are cut by northeast-trending, Late Precambrian diabase dikes. Regional foliation is northwest striking with steep northerly dips.

Gold mineralization is associated with the contact between a quartz diorite-granodiorite-diorite intrusion and a metavolcanic-metasedimentary supracrustal sequence. A network of vertically persistent quartz veining (stockwork) occurs at the contact. Irregular veins and quartz lenses/masses occur in shear zones and fractures up to 8.0 m wide.

Pyrrhotite, chalcopyrite, bornite, pyrite, and rare visible gold occur within the quartz stockwork system (Fairbairn 1938). Calcite, quartz, feldspar, sericite, biotite, chlorite, and epidote are associated with the mineralized zone.

Pyrrhotite is the main indicator for gold. Gold values on the third level and at the western end of the Property are very encouraging (I. Downie, Geologist, Duration Mines Limited, Thunder Bay, personal communication, 1987).

Underground drilling and sampling by Duration Mines Limited–Locator Explorations Limited suggests inferred reserves, from surface to the fourth level, of 540 000 tons grading 0.2 ounce gold per ton. Below the fourth level "250 000 tons of possible reserves, all of similar grade, is believed to exist at a depth between the fourth and sixth levels...". Preparation for headframe installation in early 1988 is underway. Duration Mines Limited estimates the property could produce between 25 000 to 30 000 ounces of gold per year (The Northern Miner, November 16, 1987, p.1-2).

Brinklow Occurrence

The Brinklow Occurrence is situated north of Longlac on the eastern border of Oakes Township. Bill Brinklow, Manitouwadge, Ontario, holds eighteen mining claims (TB928653, TB928654, TB941070-75, TB942324-29, TB961330, TB961331). Stripping, trenching, and a VLF survey were completed in the last two years.

The Oakes Township area is underlain by mafic metavolcanics intruded by the Croll Lake Stock, a multiphase granitic intrusion which occupies a large portion of the northern Long Lake area. Macdonald (1983) described the Croll Lake stock:

> "The Croll Lake Stock is a zoned felsic intrusion that is relatively undeformed, although weakly foliated, near contacts within the supracrustals. The core (and bulk) of the intrusion is granitic . . .surrounded successively by rinds of quartz monzonite, diorite, plagioclase-phyric diorite and quartz porphyry."

Massive to pillowed mafic metavolcanics and minor, felsic to intermediate metavolcanics and iron formation are present. The mafic metavolcanics have been hornfelsed at the contact with the Croll Lake stock.

Deformation appears to have been focussed at the contact. Foliation within the metavolcanics strikes 098°.

On the Brinklow Property, visible gold mineralization is associated with quartz veining conformable with the foliation in the felsic to mafic metavolcanic sequence. A banded iron formation, composed of magnetite and chert intruded by sugary quartz containing chalcopyrite and pyrrhotite, has been traced by the VLF survey and prospecting for 300 m. Weak, pervasive, carbonate alteration was noted in the metavolcanics.

Historically, the western end of the Croll Lake Stock has been explored for gold mineralization, but new occurrences, such as the Brinklow Occurrence, emphasize the importance of the entire metavolcanic–stock contact.

Ateba Mines Incorporated (Pan-Empire)

Ateba Mines Incorporated (Norben Gold Resources) continued exploration, development, and milling on the Pan-Empire Project, located 1 km east-northeast of Beardmore. The property consists of 13 leased claims and 59 unpatented mining claims in Summers Township. Included in the claim group is the former Northern Empire Mine which produced 149 492 ounces of gold and 19 803 ounces of silver, from ore grading 0.35 ounce gold per ton, from 1934 to 1941 (Mason and McConnell 1983). Approximately 2225 m of diamond drilling was completed in late 1986 and early 1987 on the Contact Vein and Power Vein east of the old shaft. Stripping, sampling, line cutting, and geophysics were also undertaken.

The Pan-Empire Property is hosted in the Southern Metavolcanic Sub-belt, a sequence of mafic metavolcanic flow rocks and mafic tuffs.

The Contact Vein Zone was discovered 650 m east of the Northern Empire Mine shaft. The vein consists of dark, fractured quartz containing pyrrhotite, pyrite, arsenopyrite, and gold. The zone has been summarized in the 1986 Ateba Mines Incorporated Annual Report (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay):

> "This zone was traced by drilling along a strike length of 175 meters and to a depth of 90 meters and found to contain a mineral inventory of 111,000 tonnes averaging 9.56 grams/tonne (0.28 oz/ton) gold. Further drilling to a depth of 250 meters showed the zone to extend and remain open at depth with intersections ranging from 0.7 grams/tonne (0.02 oz/ton) over 2.4 meters up to 11.3 grams/tonne (0.33 oz/ton) gold over 17 meters."

Follow-up diamond drilling in late 1987 intersected the Contact Vein Zone below a diabase dike at a vertical depth of 270 m (900 feet); hole number 10 intersected 1.3 m (4.4 feet) of mineralization grading 0.516 ounce gold per ton.

A 200 ton-per-day carbon-in-pulp gold mill previously constructed and operated by Pancontinental Mining (Canada) Limited, for milling Northern Empire waste dump material, has been revamped. The mill is located on the Pan-Empire site. Teck Corporation leased the facility in 1983 while treating Leitch dump material. Ateba's wholly-owned subsidiary, Norben Gold Resources, has the right to process three mine waste dumps in the Beardmore area, including the Northern Empire Mine, Leitch Mine, and Sturgeon River Mine. It has been estimated that the three dumps contain 445 000 tons of material averaging 0.06 ounce gold per ton (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

To upgrade dump material prior to conventional milling, an Ore Sorter, Model 32, capable of recognizing and separating gold-bearing rock pieces from waste in a high tonnage flow of particles, has been installed. The Ore Sorter has photometric and conductivity capabilities ideally suited to the Leitch Mine's and Northern Empire Mine's gold mineralization—the first two sources of millfeed. After sorting, 110 000 to 150 000 tons of millfeed will be produced, averaging 0.15 to 0.17 ounce gold per ton (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay). It is anticipated that the Ore Sorter can function eight months of the year, depending on the weather conditions. Lakefield Research, Peterborough, Ontario, predicts recoveries of 92 percent, based on pilot-scale work. Approximately 8400 ounces of gold will be poured during each of the next two twelve-month periods. Custom gold milling and assaying is available to the public. In addition, Ateba Mines Incorporated continued exploration on the Tenacity-Kondrat Property, located in McComber and Vincent Townships (The Northern Miner, October 26, 1987, p.2).

Quaternary Mining and Exploration Incorporated

Quaternary Mining and Exploration Incorporated conducted exploration programs on three contiguous properties in the Geraldton–Longlac area: Hardrock Extension Incorporated, Geraldton Longlac Gold Incorporated, and Ferau Resources Incorporated. Work included line cutting, geophysics, geological mapping, stripping, trenching, and diamond drilling.

The Hardrock Extension Incorporated Property is located immediately east of the Hard Rock Gold Mine in Ashmore Township. Magnetometer and electromagnetic surveys have outlined minor flexures and folding in iron formation. Iron formation in the Geraldton area has been known to host replacement sulphide/vein associated gold deposits (i.e. Open Stope/Glory Hole, Hard Rock Gold Mine). Detailed mapping and diamond drilling were conducted on Hardrock Peninsula, a portion of the eastern extension of the Bankfield–Tombill Fault (Barton Bay Lithotectonic Zone). Three gold zones were drilled during 1987: a) Porphyry Zone, b) Visible Gold Zone, and c) Discovery Zone.

The Porphyry Zone is a shattered quartz-feldspar porphyry body hosting quartz, arsenopyrite, pyrite, and tourmaline veins in a stockwork system. One diamond-drill hole intersected 16.5 m (55.0 feet) of 0.05 ounce gold per ton (S. Neuland and A. Stearman, Project Geologists, Quaternary Mining and Exploration Incorporated, personal communication, 1987).

The Visible Gold Zone is a composite quartz-carbonate vein hosted by deformed tuffs. Diamond drilling intersected 2.3 m (7.6 feet) of 0.27 ounce gold per ton (S. Neuland and A. Stearman, Project Geologists, Quaternary Mining and Exploration Incorporated, personal communication, 1987).

The Discovery Zone is located at Kenogamisis Lake off the eastern end of Hardrock Penninsula in a folded, deformed, and altered gabbro, mafic tuff sequence. Gold is associated with quartz veining and flooding. Typically, 10 to 15 percent quartz occurs with 5 to 10 percent pyrite, 1 to 3 percent arsenopyrite, and 1 to 3 percent tourmaline in a strongly carbonatized zone. A strike length of 143 m (475 feet) has been outlined by drilling. Assays of 0.23 ounce gold per ton across 5.3 m (17.6 feet) have been intersected as of November 10, 1987 (S. Neuland, Project Geologist, Quaternary Mining and Exploration Incorporated, personal communication, 1987).

Diamond drilling was conducted on electromagnetic and/or magnetic anomalies on the Geraldton Longlac Gold Incorporated and Ferau Resources Incorporated Properties, located east of the Hardrock Extension Incorporated Property.

The MacFarlane shaft area (Ferau Resources Incorporated), on the east side of Long Lake is underlain by northeast-striking mafic metavolcanics intruded by a feldspar porphyry body. An altered contact area hosting gold mineralization assayed 0.26 ounce gold per ton over 2.2 m (7.2 feet). Further east, drilling intersected over 6.1 m (20.2 feet) of 0.62 ounce gold per ton (S. Neuland and A. Stearman, Project Geologists, Quaternary Mining and Exploration Incorporated, personal communication, 1987).

The Coniagas Occurrence (Ferau Resources Incorporated) hosts gold associated with sheared mafic metavolcanics. Assays from drill core returned 0.065 ounce gold per ton across 3.3 m (11.0 feet), (S. Neuland, Project Geologist, Quaternary Mining and Exploration Incorporated, personal communication, 1987).

GOLD DEPOSITS: ONAMAN–TASHOTA METAVOLCANIC BELT

Lewkoski-Gagnon Property

The Lewkoski-Gagnon Property consists of 24 claims located on the eastern side of O'Sullivan Lake on the northern side of the Northeast Arm. The property encompasses three separate gold occurrences. Ed Lewkoski, Glen Lewkoski, and Frank Gagnon of Nakina, Ontario hold the mining claims. Surface prospecting, including trenching and sampling, have been completed (in 1986 and 1987).

The O'Sullivan Lake area is underlain by mafic metavolcanics consisting of massive and pillowed metavolcanics and mafic to felsic tuffs intruded by gabbro, granite, feldspar (quartz) porphyry, and diabase. Regional foliation strikes 045° to 050°. The southeastern shore of the Northeast Arm is a prominent lineament striking 050° (Moorhouse 1955).

The bedrock geology of the Lewkoski-Gagnon Property is made up of sheared massive to pillowed mafic metavolcanics intruded by numerous feldspar porphyry dikes. The Lewkoski Occurrence on claim TB989255, is an alteration zone up to 0.6 m wide located at the contact of a porphyry dike with mafic metavolcanics. Pyrite and chalcopyrite occur in the contact alteration zone. A second gold occurrence on claim TB941374 consists of pyrrhotite, and chalcopyrite with coarse, free gold in a 10 cm wide quartz vein. The vein strikes 060°, and is hosted in sheared, pillowed mafic metavolcanics. At the western end of the claim group, 1.2 km north of Pelangio Point on the shores of O'Sullivan Lake (claims TB941136 through TB941141), a 10 to 30 m wide shear zone has been prospected. The shear zone consists of carbonatized and silicified sericite schist hosting minor disseminated pyrite.

FORT HOPE AREA

GENERAL GEOLOGY AND STRUCTURE

The Fort Hope area west to Miminiska Lake is within the eastern portion of the Uchi Subprovince—an east-trending, predominantly metavolcanic-metasedimentary belt.

The Miminiska Lake area is underlain by a metasedimentary sequence of wacke, sandstone, and oxide-, carbonate-, and silicate-facies iron formation. The metasediments overlie a pillowed to massive mafic metavolcanic sequence. A second mafic metavolcanic unit is located north of the metasediments. A thin unit of coarse clastic metasediments (conglomerate, possibly sandstone, and arenite) occurs in the western part of the area. Quartz monzonite to granodiorite plutons intrude the metasedimentary-metavolcanic sequence. Diabase, feldspar porphyry, quartz-feldspar porphyry, and pegmatite dikes cut the metavolcanics (Wallace 1981).

The Opikeigen Lake–Fort Hope area to the east of Miminiska Lake has been described by Wallace (1978):

> "Alternating units of felsic metavolcanics (including rhyolitic to dacitic, fine to coarse pyroclastic rocks, and massive and autobrecciated flows) and metasediments (including wackes, argillite and derived schists, quartzite, and conglomerate) with minor bands of mafic metavolcanics are overlain by a thick accumulation of predominantly mafic metavolcanics (including basaltic to andesitic, massive and pillow lavas, amphibolite schist agglomerate, autoclastic breccia and Algoma-type iron formation). This sequence has been tightly folded into an east-west-trending belt about 13 km (8 miles) wide, bounded to the south by migmatized metasediments and paragniess, and to the north by a granodioritic batholith. Much of the northwestern part . . .is underlain by a circular diapiric intrusion of quartz monzonite and granodiorite about 8 km (5 miles) in diameter . . ."

GOLD DEPOSITS

There are three gold deposit types in the Fort Hope area (Patterson *et al.* 1987): a) gold antimony veins within shear zones, (Howells Lake); b) gold-associated, arsenopyrite-rich iron formations (Goss Lake prospects); and c) gold-tungsten veins and related shear zones hosting auriferous pyrite-pyrrhotite mineralization (Reserve Creek Occurrences). Gold mineralization is also associated with strongly foliated to sheared and mylonitized mafic to felsic metavolcanics in the Fort Hope–Miminiska area.

THUNDER BAY DRILL CORE LIBRARY REPORT

A total of 1140 m of diamond-drill core was collected, brought in from two properties in the Beardmore–Geraldton area and stored at the Thunder Bay Drill Core Library (*see* Table 5.3). Selected drill-core sections from both properties are highlighted and described in some detail as follows:

1. Wells Lake Property (Oboshkegan Township): A drill program was conducted in February of 1987 by Holmer Gold Mines Limited yielding 280 m of core over four drillholes. The host rock generally consists of dark grey-green, fine-grained mafic metavolcanic tuff and minor argillite periodically intruded by biotite lamprophyre dikes up to 2 m wide and averaging 0.5 m in width. Alteration consists of weak silicification and moderate carbonatization along fine fractures. Overall the mafic tuff is moderately foliated, containing generally 1 percent to <1 percent fine-disseminated pyrite and pyrrhotite with minor magnetite. Sections of economic interest are comprised of deformed, black, graphitic argillite up to 7 m in width containing abundant quartz-carbonate vein material and from 5 percent to 10 percent pyrite together occurring as seams, quilts, and patches. Within the mafic tuff, areas of moderate silicification containing up to 5 percent pyrite were also considered important economic targets.
2. Atlantic Twin Falls Occurrence (Irwin Township): Noranda Exploration Company Limited completed a seven-hole drill program totalling 860 m in November of 1986. Two feldspar-phyric crystal tuff units were targeted within an intermediate lapilli tuff to breccia host rock intruded by quartz-feldspar dikes. Strong foliation and shearing has produced sericite, chlorite-sericite alteration, and quartz-sericite schists in the feldspar-phyric crystal tuff units. Within these units, pervasive pyrite occurs mainly as disseminations in amounts from 1 percent to 5 percent (occasionally up to 20 percent) and as narrow, massive bands up to 1 cm in width. Minor amounts of pyrrhotite and chalcopyrite (up to 3 percent) were noted in Hole NA-86-5 (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay). Numerous quartz veins occur throughout the units.

RESEARCH AND MAPPING

Five research and/or mapping programs were funded by the Canada-Ontario Mineral Development Agreement (COMDA), which is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario,

1. Howard Williams (Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto) conducted structural studies in the Beardmore–Geraldton area and in the Quetico and Wawa Subprovinces.

TABLE 5.2

COMPANY EXPLORATION PROGRAMS

	COMPANY	TOWNSHIP/AREA	EXPLORATION
1)	Accord Resources Incorporated	Legault Township	D.D.H.
2)	Agassiz Resources Limited	Fort Hope Area	A.E.M.-VLF,A. Mag
3)	Armeno Resources Incorporated	Pijitawabik Bay	D.D.H.
4)	Ateba Mines Limited	Summers, McComber Townships	Linecutting, geophysics, geology, D.D.H., stripping, sampling
5)	BP Resources (Canada) Limited	Miminiska Lake Area	I.P., Res
6)	Baroque Resources Limited	Fort Hope/Miminiska Lake Area	VLF-E.M., Mag., D.D.H.
7)	Beardmore Gold Stake	Kirby, Lindsley Townships	A. VLF, A. Mag
8)	Blue Falcon Mines Limited	Walters Township	VLF-E.M., Mag
9)	Callisto Minerals Incorporated	Metcalfe Lake Area	Geochemistry
10)	Calnor Resources Limited	Irwin Township	VLF-E.M.
11)	Canadian Concentrators Limited	Pifher/Elmhirst Townships	Stripping, miining
12)	Canadian Gold Resources Incorporated	Lapierre Township	D.D.H.
13)	Caribbean Resources Corporation	Metcalfe Lake Area Oboshkegan Township	A.E.M.-VLF, A. Mag
14)	Carling Gold Resources Incorporated	Elmhirst, Pifher Townships	D.D.H.
15)	Cominco Limited	Fort Hope Area	VLF-E.M. HL-E.M., Mag

TABLE 5.2 Continued

16) Coulson Exploration Incorporated	Barbara, Meader Townships	A.E.M.-VLF, A. Mag.
17) Coulson Exploration Incorporated	Geraldton Area	Prospecting, linecutting, geophysics, geology
18) Coulson Exploration Incorporated	Kowkash Township Area	Prospecting, linecutting, geophysics, geology
19) Coulson Exploration Incorporated	Kirby Townships	Stripping, trenching geology
20) Cryderman Gold Incorporated	Eva Township	Linecutting, geology, D.D.H.
21) Discovery West Corporation/Rea Gold Corporation/Long Lake Gold Mines Limited	Abrey Township	Stripping, trenching, A.E.M.,-VLF, A. Mag, D.D.H.
22) Dome Exploration (Canada) Limited	Talbot Lake, Falcon Lake, Keezhik Lake, Linsley Township	D.D.H., HL-E.M., Mag
23) Duration Mines Limited	Norton Lake Area	Linecutting, stripping, trenching geology, D.D.H.
24) Duration Mines Limited/ Locator Explorations Limited	Theresa Mine (Longlac)	Linecutting, geology, geophysics, D.D.H., shaft dewatering, UG-D.D.H.
25) Farboro Resources Incorporated/ OZ Explorations Incorporated	Elmhirst Township	D.D.H.
26) Ferau Resources Incorporated/ Hardrock Extension Incorporated	McKelvie Township, McBean lake Area	D.D.H.

TABLE 5.2 Continued

27) Geraldton Longlac Gold Incorporated	Coltham, Croll McKelvie Townships	E.M., Mag
28) Gold Fields Canadian Mining Limited	Fort Hope Area	Stripping prospecting, sampling, A.E.M.-VLF, A. Mag, D.D.H.
29) Golden Rock Exploration Incoporated	Pagwachuan Lake Area	D.D.H., VLF-E.M., Mag
30) Golden Tiger Mining Exploration Company Limited	Klotz Lake Area	D.D.H.
31) Goldhunter Explorations Incorporated	Sandra Township	A.E.M.-VLF, A. Mag
32) Goldhurst Resources Incorporated	Walters Township	D.D.H.
33) Goldpost Resources Incorporated	Fort Hope Area	D.D.H.
34) Goldteck Mines Limited	Elmhirst Township	VLF-E.M., Mag, D.D.H.
35) Hardrock Extension Incorporatated	Ashmore, McKelvie Townships	E.M., Mag, D.D.H.
36) Holmer Gold Mines Limited	Gledhill Lake Area	D.D.H.
37) Homestake Mineral Development Company	Miminiska Lake Area	D.D.H.
38) Hudson Bay Gold Incorporated	Meta Lake, O'Meara, Irwin Townships	Linecutting geophysics, geochemistry, geology, D.D.H.
39) Jamie Frontier Resources Incorporated	Legault, Sandra Townships	Linecutting, geology, geophysics
40) Jet Mining Exploration Incorporated	Summer Township	A.E.M.-VLF, A. Mag
41) Kerr Addison Mines Limited	Melchett Lake Area	D.D.H., geochemistry

TABLE 5.2 Continued

42) Kowkash Gold	O'Sullivan Lake Area	Linecutting
43) Lac Minerals Limited	Ashmore, Errington Townships	D.D.H., linecutting, geophysics, geology
44) Lacana Mining Corporation	McQuesten Township	Trenching, geology, VLF-E.M., Mag
45) Leatherberry Syndicate	Lapierre Lake Area	A. Mag, A. Rad
46) Legion Resources Limited	Summers Township, Maryjane Lake Area	Overburden geochemistry
47) Metalore Resources Limited	Irwin Township	D.D.H.
48) Mimiska Exploration Incorporated	Legault Township	Linecutting, VLF-E.M., Mag, geology, D.D.H.
49) Mingold Resources Incorporated	Leduc, Legault Townships	Linecutting, geology, D.D.H., VLF-E.M., Mag, A.E.M.-VLF, A. Mag
50) Mirandore Exploration Incorporated	Wottam Lake Area	Linecutting, geophysics, D.D.H.
51) Monte Carlo Gold Mines Limited/ Kidd Resources Limited/ Daimler Resources	Lapierre Lake/Hipel	D.D.H.
52) MPH Consulting Limited	Miminiska Lake Area	Geology, D.D.H.
53) Ben Nelson Limited	Hipel, Colter Townships	A.E.M.-VLF, A. Mag
54) Nipigon Gold Resources	Eva, Summers Townships	Stripping, trenching,
55) Noramco Explorations Incorporated	Wottam Lake, Seagreen Lake, Opikeigen Lake Area (Fort Hope Area)	Linecutting, geophysics, geology, D.D.H.

TABLE 5.2 **Continued**

56) Noramco Explorations Incorporated	Frond Lake, Opikeigen Lake Area	Power stripping D.D.H.
57) Noramco Explorations Incorporated	Nesting Lake Area	Power stripping, D.D.H. sampling
58) Noranda Exploration Company Limited	Fulford Township	Linecutting, VLF-E.M., Mag, humus, geology, prospecting, sampling
59) Noranda Exploration Company Limited	Vincent Township	Rad, VLF-E.M., Mag, I.P., HL-E.M., geology, D.D.H.
60) Noranda Exploration Company Limited	Wottam Lake Area	A.E.M., A. Mag, geology, prospecting
61) Noranda Exploration Company Limited	Errington, Lindsley Townships	D.D.H.
62) Orofino Resources Limited	Rickaby Township	D.D.H.
63) Panthco Resources Incorporated	Hipel, Colter, Legault Townships	Stripping
64) Parklane Technologies Incorporated	Pifher, McComber Townships	Linecutting, geophysics, geology, trenching, stripping, D.D.H.
65) Parquet Resources Incorporated	Irwin Township	D.D.H.
66) Peddle Lake Mining Corporation	Pifher Township	Stripping, sampling, geology
67) Preussag Canada Limited	Barlow, Klotz, Low, Selwyn Townships	D.D.H.
68) Pronto Explorations Limited	Leduc Township	D.D.H.
69) Pudifin And Company	Pifher Township	A. Mag, A.E.M. sampling

TABLE 5.2 Continued

70) Rampart Resources	Legault, Leduc Townships	D.D.H.
71) Roxmark Mines Limited	McBean Lake Area	A.E.M., HL-E.M., VLF-E.M., Mag
72) Roxmark Mines Limited/ Ateba Mines Incorporated	Errington Township	Underground exploration, linecutting, stripping, D.D.H.
73) Royal Oak Resources Limited	Fulford Township	Linecutting, geology, sampling, mine dewatering
74) San Paulo Explorations Incorporated	Beardmore Area	A.E.M.-VLF, A. Mag, HL-E.M., Mag
75) Severide Resources Limited/ Pure Gold Resources Limited	Keezhik Lake Area	D.D.H. prospecting
76) Shango Resources Limited	Dorothea, Sandra Townships	A.E.M.-VLF, A. Mag
77) Sherritt Gordon Mines Limited	Oboshkegan Township	D.D.H.
78) Sweany Gold Corporation	Pifher, Irwin, Sandra Townships	Linecutting, D.D.G., I.P., geology
79) Tenacity Mining Corporation Limited	McComber Township	D.D.H., stripping
80) Tandem Resources Limited	Seagreen Lake Area	D.D.H.
81) Tandem Resources Limited	Frond Lake Area	D.D.H., road construction
82) Tashogan Minerals Limited	Tashota Area	Prospecting, geochemistry, geology
83) Teck Exploration Limtied	Eva Township	D.D.H.
84) Trans Rampart Industries Limited	Leduc, Legault Townships	Prospecting
85) Tyrol Lake Project	Tyrol Lake/Pifher, Meader Townships	A.E.M.-VLF, A. Mag

TABLE 5.2 Continued

ABBREVIATION

A.E.M.	Airborne electromagnetic survey
A. Mag	Airborne magnetometer survey
A. Rad	Airborne radiometric survey
D.D.H.	Diamond drill hole
E.M.	Electromagnetic survey
HL-E.M.	Horizontal loop electromagnetic survey
I.P.	Induced polarization
Mag	Magnetometer survey
Res	Resistivity survey
Rad	Radiometric survey
UG	Underground Work
VLF	Very Low Frequency

TABLE 5.3

THUNDER BAY DRILL CORE LIBRARY SUMMARY, 1987

PROPERTY NAME	COMPANY	LOCATION (Area, Twp)	NO. OF DDH's	TOTAL DRILLED (meters)
BEARDMORE-GERALDTON				
1. Wells Lake Property	Holmer Gold Mines Ltd.	Oboshkegan Twp.	4	280
2. Atlantic Twin Falls Occurrence	Noranda Exploration Co., Ltd.	Irwin Twp.	7	860

2. David Kresz and Boris Zayachivsky (Geologists, Precambrian Geology Section, Ontario Geological Survey, Toronto) mapped the bedrock geology of Houck, Oakes, Croll, Coltham (northern half), and Abrey Townships and the McBean Lake area.
3. Peter Friske (Applied Geochemist, Geological Survey of Canada) initiated a reconnaissance lake-bottom-sampling program in the Beardmore–Jellicoe area.
4. F.J. Kristjansson, Engineering and Terrain Geology Section, Ontario Geological Survey and L. Harvey Thorleifson, Terrain Sciences Section, Geological Survey of Canada, completed a surficial-geology-mapping and till-geochemistry project in the Beardmore–Geraldton area.
5. Heather Brown, Gail Jackson, and Al Speed, continued with an Historical Research Program in the Beardmore–Geraldton area. Numerous mineral occurrences described in The Northern Miner in the past have been lost in the records over the years. Through a program of detailed research of The Northern Miner, old newspapers, old files and personal libraries, old gold, silver, and base-metal occurrences and prospects are being rediscovered. Follow-up field checks were initiated in 1987 after a prioritized list of properties was established.
6. Jon Devaney completed an M.Sc. thesis at Lakehead University entitled "Sedimentology and Stratigraphy of the Northern and Central Metasedimentary Belts in the Beardmore–Geraldton areas of Northern Ontario".
7. Barbara Kowalski initiated an M.Sc. thesis at Lakehead University concerning alteration, radioactivity, and gold deposits in the Beardmore area.
8. B.A. Reilly, Brock University, completed an M.Sc. thesis entitled "Structural Analyses of the Paint Lake Deformation Zone, Northern Ontario".

TABLE 5.4. MAPS AND REPORTS PERTAINING TO THE BEARDMORE-GERALDTON DISTRICT PUBLISHED DURING 1987 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports

OFR 5641
OFR 5642
OFR 5644
OFR 5645
OFR 5646
OFR 5648
OFR 5655
OFR 5656
OFR 5657
OFR 5668
OFR 5669
OFR 5671

Open File Maps

OFM 82
OFM 83
OFM 84

Preliminary Maps

P. 3077
P. 3078
P. 3105

Coloured Maps

2065
2518

Miscellaneous Papers

MP 134
MP 136
MP 137

Mineral Resources Branch Publications

MPBP 23
MPBP 24

Mineral Deposit Circulars

MDC 26

9. K.Y. Soo, Brock University, initiated an M.Sc. thesis entitled "The Geology and Geochemistry of Mafic Rock Within the Beardmore–Geraldton Belt".
10. P. Fralick (Professor, Lakehead University), T.J. Barrett (Professor, McGill University), and I. Jarvis (B.Sc. Candidate) conducted a rare-earth-element geochemical study of Archean iron-formation north of Lake Superior, including the Beardmore–Geraldton area.

QUATERNARY GEOLOGY AND GOLD EXPLORATION IN THE BEARDMORE–GERALDTON AREA (COMDA)

F.J. Kristjansson and L.H. Thorleifson, under the Canada-Ontario Mineral Development Agreement (COMDA), conducted a Quaternary geological mapping and geochemistry program.

The most notable characteristic of the study area is the excellent exposure and preservation of the subglacial landscape. In this regard, a lack of burial by proglacial sediments has provided an opportunity to examine in detail a variety of terrain types dominated by a till cover. Because till represents a prime exploration target in areas of glaciated terrain, an important objective of the program was to investigate till-composition variability, till sedimentology and stratigraphy, and the relationship of these factors to terrain characteristics such as percentage exposed bedrock, or continuity and thickness of the till cover.

A local lodgement till, which occurs as a thin, discontinuous sheet immediately overlying the bedrock, represents the earliest till deposition documented from the study area. This till type was encountered frequently at the surface in bedrock-dominated terrain associated with a thin till cover, and occasionally at the base of boreholes in areas of thick till cover. Transported, very calcareous till, consisting of lodgement and melt-out varieties, is the dominant till of the study area. Within the Turkey Lake–Wildgoose Lake area, this calcareous till variety forms a thick and laterally extensive sheet. Finally, a local melt-out till occurs as a thin, discontinuous veneer overlying bedrock or nonlocal, very calcareous till. There appears to be a strong relationship between the presence of local melt-out till and bedrock-dominated upland areas.

Many surface till samples collected from areas of thin till (which is common in the Beardmore area) contained visible gold grains. Gold grains were not encountered in surface till samples obtained from areas of thick till as in the Turkey Lake–Wildgoose Lake area. These observations reflect the occurrence and distribution at the surface of local and nonlocal till respectively and underscore from a gold exploration perspective, the importance of accurate till identification.

HISTORICAL RESEARCH PROGRAM (COMDA)

The McFarlane-Marion Occurrence

The McFarlane-Marion Occurrence is located 6.4 km (4 miles) east of Redmond on the Canadian National Railway in the south-central part of Gzowski Township.

According to Amukun (1977), the occurrence should be at, or near, the contact of the Gzowski Lake Stock and a sequence of felsic metavolcanics lying to the east of the stock. Hopkins (1916) describes the property as follows:

> ". . .on the north side of the track on claim T.B. 2722, is a quartz, calcite vein, two to ten feet wide in a Keewatin greenstone which is said to extend across several claims in an east-west direction. Mr. McFarlane has sunk a pit 11 feet deep on the vein where it strikes south 70 degrees east and dips 70 degrees to the north. A one-half inch vein of galena occurs near the footwall. Chipped samples for assay taken in three sections with a moil and hammer across the vein, at the bottom of the pit vein gave as follows:
>
> No. 1: 1 1/2 ft. hanging wall part of vein, gold none; silver none.
>
> No. 2: 3 1/2 ft. centre of vein, gold $1.20; silver none.
>
> No. 3: 1 1/2 in. footwall part of vein, containing galena, gold $6.00; silver none."

The above assays in dollars for gold would convert into values (gold at $20.67 per ounce in 1916) ranging from 0.05 to 0.30 ounce gold per ton.

This occurrence and the high mineral potential rocks in the immediate area, are currently not staked. Further prospecting and reinvestigation are warranted. The contact of the Gzowski Lake Stock with the mafic and felsic to intermediate metavolcanics is a main target for rediscovering the McFarlane-Marion Occurrence and potentially other gold mineralization.

Muton Longlac Gold Mines

Muton Long Lac Gold Mines (also known as Muton Champagne Gold Mines) held a number of properties in the Beardmore–Geraldton area in 1934 and 1935. One of these properties is located approximately 11 km (7 miles) east of Jellicoe, south of Wildgoose Lake. Access is by the Kinghorn Road and the Canadian National Railway. The property visited has very little rock exposure, except along a portion of the railway tracks. The rock outcrop observed consists of mafic metavolcanics containing minor quartz veins and veinlets. Three (3) grab samples taken from this area, containing some pyrite mineralization, yielded values from trace to 0.02 ounce gold per ton. A chip sample across a width of 3 m (10 feet) yielding 1.79 ounces gold per ton reported from one of the companies' properties (The Northern Miner, November 29, 1934, p.4) could not be substantiated. It is not known if the sample came from the property visited. None of the reported workings were found at the time of the visit.

RECOMMENDATIONS FOR EXPLORATION

Areas of glacial till cover in the Beardmore–Geraldton area, particularly west of Geraldton, masking high mineral potential rocks for gold mineralization should be prospected using till sampling for pathfinder elements and gold. Backhoe, reverse circulation, and/or sonic-drill samples could be analyzed for boron, antimony, arsenic, tungsten, gold, silver, zinc, copper, and lead. Recent till-stratigraphy and geochemistry data from F.J. Kristjansson (Ontario Geological Survey) and T.H. Thorleifson (Geological Survey of Canada) emphasizes the need for till exploration.

The increased use of IP surveys for disseminated sulphide mineral associated gold deposits is recommended in the Onaman–Tashota Metavolcanic Belt and the Beardmore–Geraldton Belt.

Deformation zones, including regional, transcurrent-fault and associated splay-fault zones (that may appear as lineaments on geological maps) potentially hosting gold mineralization, should be explored for using prospecting, ground magnetic and VLF surveys, satellite imagery, and airphotos. Alteration zones of carbonate, silica, potassium, and/or hematite associated with sulphide minerals (mainly pyrite) can occur associated with gold in such structures.

Vein-type gold occurrences should be re-evaluated. The reopening of the Ateba Mines Incorporated Pan-Empire Mill at Beardmore will permit custom gold milling and bulk sampling. Exploration using a combination of diamond drilling and bulk sampling on "nugget-effect" veins is recommended. Quartz-carbonate vein deposits, minable by surface methods and ultimately by decline, are present. The theme to be reinforced is "mine ounces not tons", emphasizing the high-grade (0.4 ounce gold per ton) nature of many veins in the Beardmore–Geraldton area.

Current base-metal-price trends suggest a return to exploration for copper, zinc, silver, and lead-zinc mineralization to be appropriate. The Marshall Lake–O'Sullivan Lake area and Onaman River area of the Onaman–Tashota Belt, have high mineral potential for base metals and host presently subeconomic base-metal deposits.

The potential for mafic and ultramafic intrusions in the Beardmore–Geraldton District, hosting platinum group element (PGE) mineralization has not been thoroughly evaluated. Currently, exploration attention has been focussed on other portions of the Thunder Bay Mining Division for PGE.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

Ontario Mineral Exploration Program eligible exploration expenditures in the Beardmore–Geraldton Resident Geologist's Area totalled $14 778 311, for 1987. Potential OMEP assistance for these exploration expenditures totaled $3 694 579.

PROPERTY VISITS, 1987

BEARDMORE–GERALDTON DISTRICT

1. ANGLE LAKE PROPERTY (E. Rentz)
2. BANANA LAKE PROPERTY (B. Mehaffey)
3. BANKFIELD MINE (Noranda Exploration Company Limited)
4. BRINKLOW OCCURRENCE
5. BROOKBANK PROSPECT (Hudson Bay Gold Incorporated-Metalore Resources Limited)
6. F. BYRON PROPERTY
7. CHOWDER LAKE PROSPECT (Golden Tiger Mining Exploration Company Incorporated)
8. CONSOLIDATED MOSHER MINE (Lac Minerals Limited)

9. CROOKED GREEN CREEK No. 1 ZONE (Sweany Gold Corporation)
10. CROOKED GREEN CREEK No. 2 (Parklane Technologies Incorporated)
11. EVA LAKE PROPERTY (E. Rutherford)
12. FERNOW LAKE OCCURRENCE (Kelmet Resources Limited)
13. F. GAGNON OCCURRENCE
14. HUTCHISON LAKE MINE (Royal Oak Resources)
15. KOWKASH RIVER PROPERTY (F. Byron Property)
16. LEWKOSKI OCCURRENCE
17. MACLEOD-COCKSHUTT MINE (Lac Minerals Limited)
18. MAGNET CONSOLIDATED MINE (Roxmark Mines Limited-Ateba Mines Incorporated)
19. MURIEL LAKE OCCURRENCE (D. Downey)
20. NORTHERN EMPIRE MINE (Ateba Mines Incorporated)
21. PICHETTE OCCURRENCE
22. SANDY CREEK OCCURRENCE (Panthco Resources Incorporated)
23. THERESA GOLD MINE (Duration Mines Limited—Locator Explorations Limited.)
24. TREPTOW LAKE OCCURRENCE (T. Head)

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6. Schreiber–Hemlo Resident Geologist's Area—1987

B.R. Schnieders[1], M.C. Smyk[2], and G.D. White[3]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[3]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

INTRODUCTION

In January 1987, the Mines and Mineral Division, Ontario Ministry of Northern Development and Mines, Northwestern Region, reorganized and subdivided the Thunder Bay Resident Geologist's area into three districts: 1) the Thunder Bay District; 2) the Beardmore–Geraldton District; and 3) the Schreiber–Hemlo District. B.R. Schnieders was appointed Resident Geologist of the Schreiber–Hemlo area and A.A. Speed assisted as Staff Geologist until August 1987. In August, M.C. Smyk began duties as Staff Geologist. P. Perry, Resource Geologist, prepared Geological Data Inventory Folios (GDIFs), provided assessment file supervision, library and office organization, and editorial support. S. Koski maintained the assessment files.

ACKNOWLEDGMENTS

Technical support and assistance were provided by M.C. Smyk, who wrote sections of this report and constructed figures, and G. White, author of the Thunder Bay Drill Core Library section.

In addition, P. Perry and K.G. Fenwick edited this report, S. Koski organized and typed tables, and A. Mansfield typed the original draft. D. Chiasson provided assistance in the Marathon field office.

All analytical work was conducted by Geoscience Laboratories, Ontario Geological Survey, Toronto.

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

During 1987, the Schreiber–Hemlo Resident Geologist's staff dealt with over 550 enquiries from the general public and mining sector. In addition, over 37 property visits (Table 6.1), three mine tours, five oral presentations, seven poster displays, and six field trips were conducted. Six seminars or conferences were attended, and a presentation was given to a touring Chinese geological delegation.

The Geoscience Seminar was organized and hosted in Thunder Bay in February 1987, and the 1987 Small-Scale Mining Seminar was hosted in April. Each seminar was attended by over 230 participants.

Small–scale mining and the Hemlo Story are ongoing video projects being prepared by the Thunder Bay staff. During October, T. Muir, M.C. Smyk, and B.R. Schnieders spent three days with a high-pressure water pump stripping outcrops along the Hemlo Highway section (Highway 17) for future Hemlo field trips.

GENERAL GEOLOGY

The Schreiber–Hemlo area is underlain by Early to Late Precambrian rocks. The Archean rocks represent a portion of the Abitibi–Wawa Belt of the Superior Structural Province. These rocks are made up of a supracrustal metavolcanic-metasedimentary sequence which has been intruded by granitic-syenitic plutons and metagabbroic dikes and sills.

The supracrustal rocks occur in three main belts within the Schreiber–Hemlo area: 1) the Schreiber–Terrace Bay area, 2) the Hemlo area, and 3) the Manitouwadge area.

The metavolcanic rocks in the Schreiber–Terrace Bay area consist of iron-rich tholeiites including mafic to intermediate massive and pillowed flows, tuffs, and pyroclastic rocks. Calc-alkalic felsic metavolcanic rocks include flows, tuffs, and pyroclastic rocks (Marmont 1984). The metasedimentary rocks consist predominantly of graded turbiditic sequences, minor conglomerate, and iron formation. Intruding the metavolcanic and metasedimentary rocks is the Terrace Bay Batholith. This 25 km long by 8 km wide batholith consists predominately of medium-grained granodiorite, and minor diorite, quartz monzodiorite, tonalite, and biotite hornblende granite (Marmont 1984). Mafic intrusive rocks include gabbro and diorite.

The Hemlo area is described by Muir (1982):

> "The area is part of a small greenstone belt, an eastern extension of the Schreiber–Marathon Belt, that is terminated in the west by Lake Superior and in the east by granitic terrain. The Abitibi Belt lies further to the east.
>
> Two easterly trending sequences of Early Precambrian (Archean) supracrustal rocks are present. The Heron Bay Sequence consists of the following: mafic flows that are tholeiitic basalts, mixed with calc-alkalic volcanic rocks that are mostly dacitic, but range from basalt to rhyolite; and closely related metasediments. The Playter Harbour Sequence consists almost entirely of mafic flows of tholeiitic basalt composition. The two sequences may be directly related to each other, and at one time, may have been joined in the area of Mussy and Cache Lakes. In the Heron Bay Sequence, there is a crude, lateral facies change west to east as follows: intermediate to felsic pyroclastic rocks; metasediments derived from unlithified volcanic material of intermediate to felsic composition; and mudstones and wackes largely derived from epiclastic volcanic detritus. The supracrustal rocks have been metamorphosed under low-grade, and locally, medium-grade conditions.
>
> Early Precambrian ultramafic and mafic intrusive rocks consist of lherzolite, pyroxenite, and re-

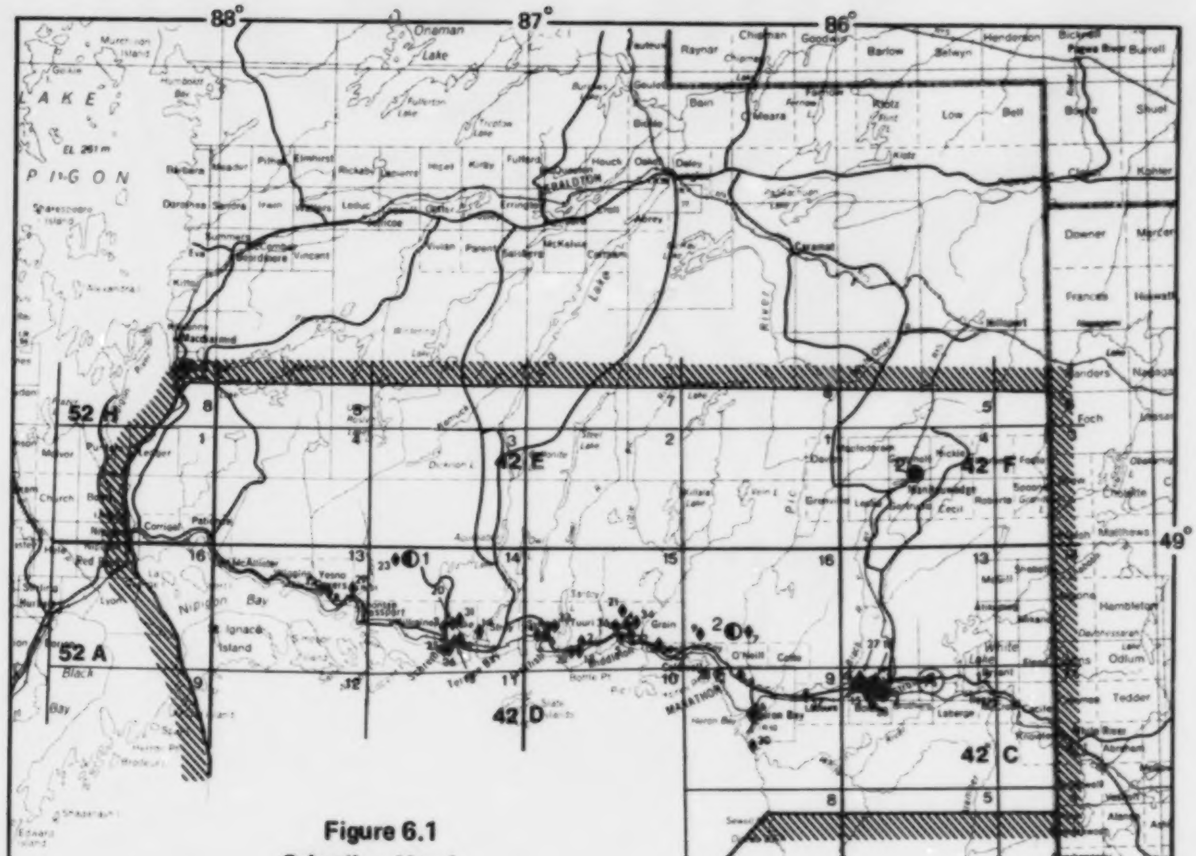
88°
87°
86°
49°
48°
LAKE NIPIGON
52 H
42 E
42 F
52 A
42 D
42 C
Nipigon Bay
St. Ignace Island
MARATHON
Michipicoten Island
N
SCALE
0 25 mi.
0 20 40 km

Figure 6.1
Schreiber Hemlo
Resident Geologist's Area

EXPLANATION

● PRODUCING MINES, 1987
  1. David Bell Mine
  2. Geco Division, Noranda Incorporated
  3. Golden Giant Mine
  4. Page-Williams Mine

◐ MINES AND/OR PROPERTIES UNDER DEVELOPMENT, 1987
  1. Minnova Inc. Winston Lake Division
  2. Euralba Mining Ltd./Fleck Resources Ltd. Marathon Cu-PGE Deposit

♦ PROPERTY VISITS, 1987 (keyed to TABLE 2)

Ⓐ LOCATION OF OGS FIELD PARTY IN 1987

HEMLO TECTONO-STRATIGRAPHIC STUDY, T. MUIR

TABLE 6.1 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

A-Airborne Survey
AEM-Airborne Electromagnetic Survey
AI-Airphoto Interpretation
A Mag-Airborne Magnetometer Survey
Assess-Assessment Work
CE-Cost Estimates
DD-Diamond Drilling (where shown the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively)
DR-Drilling Report
EM-Electromagnetic Survey
Geochem-Geochemical Survey
Geophys-Geophysical Report
GL-Geological Survey

Gr-Gravity Survey
HLEM-Horizontal Loop Electromagnetic Survey
IP-Induced Polarization Survey
Mag-Magnetometer Survey
Man Work-Manual Work
Mech Work-Mechanical Work
OMEP-Ontario Mineral Exploration Program
PR-Property Report
(r)-Rock
(S)-Soil
SA-Sampling, Assays
STr-Power Stripping
Tr-Trenching
VLF-Very Low Frequency

Ag-Silver
Au-Gold
Cu-Copper
DS-Dimension Stone
PGE-Platinum Group Elements
Pd-Palladium
Pt-Platinum
si-Silica
Zn-Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lecours Twp. (G-2863)	42D9/NE	1. Autocrat Resources Ltd.	Au	OMEP	PR, IP	1982, 1984	63.4364	
Pic Twp. (G-630)	42D9/NW	2. BP Resources Canada Ltd. (Selco Division) (McChristie Option)	PGE, Cu	Assess	VLF, Mag	1987	2.10223	
Lower Aguasabon Lake (G-599)	42D14/NE	3. Barracuda Resources Ltd.	Au	OMEP	IP	1984	63.4572	
Seeley Lake (G-613)	42D16/SW	4. Brown McDade Resources Ltd. (Noranda Exploration Company Ltd.)	Au	Assess	Geochem (S), SA	1986	2.9676	
Seeley Lake (G-613)	42D16/SW	5. Can-Tel Mineta Property (Noranda Exploration Company Ltd.) (Filo, K.)	Au	Assess	DD 2-310 m	1985	-	
Santoy Lake (G-612)	42D15/NW	6. Canadian Cariboo Resources Ltd.	Au	Assess	Geochem (r)/(S), SA, GL, VLF, Mag	1986	2.9672	
Rous Lake (G-611), Lorna Lake (G-598), Wabikopa Lake (G-620)	42D9/NE, 42D16/SE, 42C13/SW	7. Captain Consolidated Resources/ Koala Resources (Murray, B.)	Au	Assess	DD 4-490.2 m	1986	-	
Molson Lake (G-603)	42C12/NW	8. Caravelle Resources	Au	OMEP	PR	1983	63.4323	
Lorna Lake (G-598)	42D16/SE	9a. Carlson Mines Ltd. (Black Gregor Mines Ltd.) (Wire Lake Gold Prospect)	Au	Assess	GL - Map only, PR, DR, DD 8-915.5 m, SA	1987	-	
Lorna Lake (G-598), Cirrus Lake (G-587)	42D16/SE/ NE	9b. Carlson Mines Ltd. (Kumix Resources Corp.) (Marathon Project)	Au	Assess	Geochem (S), SA, VLF, GL	1987	2.9833	

TABLE 6.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Priske Twp. (G-631)	42D14/SE	10a. Corp. Falconbridge Copper (Stankey, G.) (Schreiber Pyramid Prop.)	Cu, Zn, Au	Assess	GL, Geochem (r)	1985	2.9831	
Priske Twp. (G-631)	42D14/SE	10b. Corp. Falconbridge Copper (Stankey, G.)	Cu, Zn, Au	Assess	STr	1985	-	
Priske Twp. (G-631)	42D14/SE	10c. Corp. Falconbridge Copper (Stankey Option)	Cu, Zn, Au	Assess	STr	1986	-	
Santoy Lake (G-612)	42D15/NW	11. Duke Minerals Ltd. (Larry Creek Lake Project)	Au	Assess	Geochem, GL, SA	1986	2.9378	
Tuuri Twp. (G-635)	42D15/SW	12a. Eldor Resources Ltd. (Project 590)	Cu, Zn	Assess	Geochem (r)/(S), GL, SA, VLF, Mag	1986	2.9722	
Pic Twp. (G-630)	42D9/NW	12b. Eldor Resources Ltd. (Project 655)	Au	Assess	DD 3-426.3 m	1987	-	
Pic Twp. (G-630)	42D9/NW	13. Esso Resources Canada Ltd. (Toothpick Project)	Au	Assess	DD 1-51.21 m	1987	-	
Syine Twp. (G-634)	42D15/SW	14a. Ferguson, Audrey	Au, Ag	Assess	Mech Work, Man Work	1986	-	
Syine Twp. (G-634)	42D15/SW	14b. Ferguson, Audrey	Au, Ag	Assess	Mech Work	1986	-	
Syine Twp. (G-634)	42D15/SW	14c. Ferguson, Audrey (Christie Creek Project)	Au, Ag	Assess	VLF, Mag	1987	2.10041	
Syine Twp. (G-634)	42D15/SW	14d. Ferguson, Audrey	Au, Ag	Assess	Mech Work	1987	-	
Syine Twp. (G-634)	42D15/SW	14e. Ferguson, Audrey	Au, Ag	Assess	Mech Work	1987	-	
Syine Twp. (G-634)	42D15/SW	15. Ferguson, Jon	Au	Assess	Man Work	1986	-	
Middle Fox Lake/ Yesno Twp. (G-85)	42D13/NE	16. Fournier, Elwood	Au	Assess	STr, DD 1-17 m	1987	-	
Rous Lake (G-611), Lecours Twp. (G-2863), Molson Lake (G-603)	42D9/NE, 42C12/NW	17. Gold Fields Canadian Mining Ltd.	Au	OMEP	Geochem, SA, DR, AI, GL, Gr	1984, 1985	63.4639	
Upper Aguasabon Lake (G-617)	42E3/SE	18a. Golden Range Resources Inc.	Cu, Zn	Assess	DR, DD 18-1442.75 m, SA	1986, 1987	-	
Upper Aguasabon Lake (G-617)	42E3/SE	18b. Golden Range Resources Inc.	Cu, Zn	Assess	Geochem (S), SA	1985, 1987	2.10064	
Syine Twp. (G-634)	42D15/SW	19. Hamel, J. R.	Au, Ag	Assess	STr, Mech Work	1986	-	
Pic Twp. (G-630)	42D9/NW/ NE	20a. Hudson Bay Exploration & Development Co. Ltd. (Golden Range #2 Property)	Au	Assess	GL, IP	1985	2.8681	
Pic Twp. (G-630)	42D9/NW	20b. Hudson Bay Exploration & Development Co. Ltd. (Golden Range Hemlo No. 2 Option)	Au, Ag	Assess	DD 1-203 m, SA	1986	-	

TABLE 6.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lecours Twp. (G-2863)	42D9/NE	21. Intercontinental Energy Corp.	Au	OMEP	SA	1983	63.4421	
Lecours Twp. (G-2863)	42D9/NE	22. International Laco Resources Inc.	Au	OMEP	IP - Report only	1983	63.4420	
Walsh Twp. (G-636), Tuuri Twp. (G-635)	42D15/SE/SW	23a. International Wildrose Resources Ltd.	Au, Cu, Zn	Assess	Mech Work	1986	-	
Walsh Twp. (G-636), Tuuri Twp. (G-635)	42D15/SW/SE	23b. International Wildrose Resources Ltd. (McKellar Harbour Prop.)	Au, Cu, Zn	Assess	Tr, IP, VLF, Mag, SA	1986	2.9612	
Wabikoba Lake (G-620)	42C13/SW	24a. Kelley-Kerr Energy Corp. (Noranda Explor. Co. Ltd.)	Au	Assess	Man Work, STr	1986	-	
Wabikoba Lake (G-620)	42C13/SW	24b. Kelley-Kerr Energy Corp. (Noranda Explor. Co. Ltd.)	Au	Assess	Tr, SA	1987	2.10129	
Tuuri Twp. (G-635)	42D15/SW	25. Kingdom Resources Ltd.	Au	Assess	DD 4-397.6 m, SA	1986, 1987	-	
Pic Twp. (G-630)	42D9/NW	26. Kusserow, Gunther	Au	Assess	STr	1986	-	
Priske Twp. (G-631), Killraine Twp. (G-625)	42D14/SW/SE	27. Lincoln Resources Inc. (Mintax 1984 Ltd. Partnership)	Au	OMEP	AEM, EM, Mag	1983, 1984, 1985	63.4566	
Lower Aguasabon Lake (G-599), Strey Twp. (G-633)	42D14/NE/SE	28. Lunar Resources Ltd. (Montrose Energy Ltd.)	Au	OMEP	CE	1983	63.4391	
Pic Twp. (G-630)	42D9/NW	29. Lytton Minerals	Au	OMEP	DR, DD 13-3331.5 m, EM, Mag	1984, 1985	63.4269	
Bomby Twp. (G-3173), Rous Lake/Lecours Twp. (G-2863)	42C12/NW, 42D9/NE	30a. Melrose Resources Ltd. (502095 Ontario Ltd.)	Au	OMEP	DR, Geochem (r), SA, GL, IP	1984	63.4580	
Lecours Twp. (G-2863)	42C12/NW	30b. Melrose Resources Project (Noranda Explor. Co. Ltd.)	Au	Assess	SA	1986	2.10153	
Middle Fox Lake/ Yesno Twp. (G-85)	42D13/NE	31. Merkoske, Leo	Au	Assess	Man Work	1986	-	
Syine Twp. (G-634)	42D15/SW	32. Micham Explor. Inc.	Au, Ag	Assess	DD 10-1673.1 m	1987	-	
Pays Plat Lake (G-606)	42D14/NW	33. Minnova Inc.	Cu, Zn, Au	Assess	DD 2-1418 m	1987	-	
Priske Twp. (G-631), Strey Twp. (G-633)	42D14/SE	34. Morgain Minerals Inc. (Gold Range, Hays Lake, McKenna-McCann)	Au	OMEP	PR, SA	1984	63.4551	
Oskabukuta Lake (G-3775)	42C12/SE	35. New Beginnings Resources Ltd. (Oskabukuta River Project)	Au	Assess	DD 13-2057.53 m, SA	1987	-	

TABLE 6.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Killala Lake (G-596), Vein Creek (G-618), Foxtrap Lake (G-592)	42E2/SE, 42E1/SW, 42D15/NE	36a. Noranda Exploration Co. Ltd. (Killala Lake Property)	Au, Pt, Pd	Assess	GL, VLF, Mag, AEM, SA (r)/(S)	1985	2.10088	
Killraine Twp. (G-625)	42D14/SW	36b. Noranda Exploration Co. Ltd. (Victoria Lake Property)	Cu, Zn	Assess	DD 3-526 m	1984	-	
Killraine Twp. (G-625)	42D14/SW	36c. Noranda Exploration Co. Ltd. (Victoria Lake Claims)	Cu, Zn	Assess	Mag	1986	2.10208	
Killraine Twp. (G-625)	42D14/SW	36d. Noranda Exploration Co. Ltd. (Victoria Lake Claims)	Cu, Zn	Assess	Mag	1986	2.10184	
Martinet Lake (G-601), Vein Creek (G-618)	42D16/NW, 42E1/SW	36e. Noranda Exploration Co. Ltd. (Huck Lake Venture)	Au	Assess	GL, HLEM, Mag, SA	1986	2.9278	
Martinet Lake (G-601)	42D16/NW	36f. Noranda Exploration Co. Ltd. (Huck Lake Property)	Au	Assess	DD 3-299 m	1987	-	
Pic Twp. (G-630)	42D9/NW	36g. Noranda Exploration Co. Ltd. (Prospect Cove Property)	Au	Assess	VLF, Mag	1987	2.10128	
Pic Twp. (G-630)	42D9/NW	36h. Noranda Exploration Co. Ltd. (Prospect Cove Property)	Au	Assess	Geochem (r), SA, GL	1987	2.10154	
Seeley Lake (G-613)	42D16/SW	36i. Noranda Exploration Co. Ltd. (Page Lake Group)	Au	Assess	Geochem (S), SA	1987	2.9781	
Vein Creek (G-618)	42E1/SW	36j. Noranda Exploration Co. Ltd. (Killala Lake Claim Group)	Au	Assess	A Mag	1985	2.10091	
Wabikoba Lake (G-620)	42C13/SW	36k. Noranda Exploration Co. Ltd. (Shiningtree Gold Resources Option)	Au	Assess	Geochem (r)/(S), SA, GL, Mag	1987	2.10294	
Wabikoba Lake (G-620)	42C13/SW	36l. Noranda Exploration Co. Ltd. (Newjay Prop.)	Au	Assess	GL, Mag, VLF, Geochem (r)/(S), SA	1987	2.10467	
McGraw Lake (G-602)	42F4/SE	37. Noranda Inc. (Geco Division)	Au	Assess	DD 4-1106 m, SA	1987	-	
Olie Lake (G-605), Flanders Lake (G-590), Loken Lake (G-597), Foch Lake (G-591)	42F5/SE, 42F6/SW, 42F4/NE, 42F3/NW	38. North American Mining & Exploration Ltd.	Au	OMEP	PR	1984	63.4561	
Coldwell Twp. (G-781)	42D15/SE	39a. Petrunka, David F.	DS	Assess	STr	1986	-	
Seeley Lake (G-613)	42D16/SW	39b. Petrunka, David F.	DS	Assess	Mech Work	1986	-	

TABLE 6.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wabikoba Lake (G-620)	42C13/SW	40. Pryme Energy (North) (Noranda Exploration Co. Ltd.)	Au	Assess	SA	1985	2.9412	
Wabikoba Lake (G-620)	42C13/SW	41. Qued Resources Ltd.	Au	OMEP	Geochem (r)/(S), SA, Tr, GL	1984	63.4434	
Molson Lake/Brothers Twp. (G-3172)	42C12/NW	42a. Rose Resources Corp. (Petrostates Resource Corp.)	Au	OMEP	PR	1985	63.4652	
Molson Lake/Brothers Twp. (G-3172)	42C12/NW	42b. Rose Resources Corp. (Petrostates Resource Corp.)	Au	Assess	SA	1986	2.9970	
Seeley Lake (G-613)	42D16/SW	43a. St. Joe Canada Inc. (O'Neil Prop.)	PGE, Cu, Pt, Pd	Assess	Mag	1987	2.10135	
Seeley Lake (G-613)	42D16/SW	43b. St. Joe Canada Inc. (Geordie Lake Property)	PGE, Cu	Assess	Mag	1987	2.10245	
Seeley Lake (G-613)	42D16/SW	43c. St. Joe Canada Inc. (O'Neil Prop.)	PGE, Cu	Assess	GL	1987	2.10421	
Rossport Area (G-610)	42D13/SE	44. Seebar, Walter	si	Assess	SA	1985, 1986	2.10146	
Pic Twp. (G-630)	42D9/NW	45a. Shoila Resources Ltd.	Au	Assess	Mag, DR, DD 5-830.79 m, SA	1986	2.9607	
Pic Twp. (G-630)	42D9/NW	45b. Shoila Resources Ltd.	Au	Assess	DD 5-824.78 m, SA	1986	-	
Tuuri Twp. (G-635)	42D15/SW	46. Silver Sceptre Mines Ltd.	Au	OMEP	Geophys, DR	1984	63.4491	
Priske Twp. (G-631)	42D14/SW	47a. Skalesky, Paul J.	Au	Assess	STr	1987	-	
Priske Twp. (G-631)	42D14/SW	47b. Skalesky, Paul J.	Au	Assess	Mech Work, STr	1987	-	
Molson Lake/Bomby Twp. (G-3173)	42C12/NW	48a. Teck Explor. Ltd. (Interlake Develop. Corp.) (Int.'l Corona Resources Ltd.)	Au	OMEP	Geochem, GL, Mag, DD 15-12,428.56 m, SA, PR	1983	63.4477	
Molson Lake/Bomby Twp. (G-3173)	42C12/NW	48b. Teck Explor. Ltd. (Interlake Develop. Corp.)	Au	OMEP	PR, GL, AEM, A Mag, DD 5-6137.9 m, SA	1984	63.4447	
Lecours Twp. (G-2863)	42D9/NE	49. Tuscaloosa Oil & Gas Inc.	Au	OMEP	PR, GL, IP	1982, 1984	63.4381	
White Lake (North) (G-622)	42C13/SE	50. Tylox Resources	Au	OMEP	DR, DD 1-224 m, SA	1985, 1986	63.4621	

lated gabbro that have intruded the mafic volcanic rocks of the Playter Harbour Sequence.

Four, large, Early Precambrian (Archean) granitic bodies separate the supracrustal sequences. The Pukaskwa Gneissic Complex consists mainly of variable, foliated, lineated, and gneissic biotite-hornblende trondhjemite and granodiorite that contains phenocrysts of plagioclase and is protomylonitic along its margins. The Gowan Lake Pluton consists mainly of lineated to massive biotite-hornblende quartz monzonite with microcline phenocrysts, and finer grained, massive, biotite-hornblende quartz monzonite. The Heron Bay Pluton consists mainly of massive hornblende-biotite granodiorite which locally contains microcline or plagioclase phenocrysts. The Cedar Lake Pluton is similar to the Heron Bay Pluton and consists of hornblende-biotite granodiorite. Late dikes of feldspar porphyry, aplite, and pegmatite have intruded the supracrustal and granitic rocks."

Friesen *et al.* (1982) summarized the regional geology of the Manitouwadge area:

> "The supracrustal sequence in the Manitouwadge area has been highly metamorphosed to form gneisses and schists locally of the almandine-amphibolite grade of regional metamorphism. In the Manitouwadge area, this sequence may be subdivided into four distinct, conformable, east-west-trending units which, from north to south are: 1) Quetico paragneisses, 2) granitized felsic and mafic gneisses, 3) the Manitouwadge Mine Series (metavolcanic and metasedimentary gneisses and schists), and 4) granitized felsic gneisses.
>
> The rocks have undergone at least two major periods of deformation. The folds of the initial and dominant period were formed about a series of 055° to 070°-trending axes. The Manitouwadge area is considered to be located on the overturned limb of a major fold developed during this

TABLE 6.2. 1987 PROPERTY VISITS

SCHREIBER-HEMLO DISTRICT

1) Beavercreek (Forerunner Resources)
2) Black Fox
3) Cooks Lake
4) Dead Horse Creek (North)
5) Dead Horse Creek (South)
6) Elgin
7) Fleck Marathon Cu-PGE Property
8) Fournier
9) Geordie Lake (MacRae)
10) Golden Giant Mine
11) Gold Range
12) Halonen Amethyst
13) Harkness-Hays
14) Hays Lake
15) Hemlo Highway Section
16) Heron Bay (Peekongay)
17) Kingdom
18) Layered Gabbro
19) Little Pic Lookout
20) McKenna-McCann
21) Michano (Jr.)
22) Michano (Sr.)
23) Minnova Inc. Winston Lake Division
24) Mogotherium
25) Morley High Grade
26) Morley Pyrite
27) Page-Williams Mine
28) Past Quarry Sites
29) Pays Plat Silver
30) Pukaskwa National Park
31) Schreiber-Pyramid
32) Simard-Swetz
33) Siville-Ferrier
34) Unocal (Dead Horse Creek REE)
35) Walton (Bomby Twp.)
36) Walton (Dead Horse)
37) Walton (Lecours Twp.)

period. Individual folds in this system are typically asymmetrical and vary in amplitude from several centimeters to tens of kilometers. A second fold system is believed to have developed about a series of northwest-trending axes. Though difficult to illustrate on an outcrop scale, such folds are indicated by a systematic broad scale undulation in plunge of the northeast-trending folds. Interaction of these fold systems has developed four major structures. From west to east these are the Blackman Lake Antiform, the Manitouwadge Synform, the Banana Lake Antiform and the Moshkanabi Lake Synform. All known orebodies are contained in the Manitouwadge Synform.

The oldest known intrusions in the area are isolated lenses of metagabbro associated with mafic orthogneiss. Widespread granitization, possibly of Algoman age has produced hybrid rocks, some of which are truly intrusive. Locally, these are represented by pegmatite dikes up to 100 m thick and by various rocks of granitic - to granodioritic composition. Diabase dikes up to 70 m thick intrude all rocks in the area and generally follow the major fault trends which are north, northeast, and northwest. These faults appear as prominent regional lineaments and typically have near-vertical dips. They exhibit strike-slip movement with only minor displacements."

Middle Precambrian rocks unconformably overlie the Early Precambrian rocks. The Gunflint and Rove Formation sedimentary rocks consist of conglomerate, black shale, and Superior-type ironstone. Late Precambrian sedimentary rocks unconformably overlie Early and Middle Precambrian rocks. The Sibley Group consists of conglomerate, sandstone, shale, carbonates, and chert. Keweenawan rocks are represented by diabase dikes and sills, and mafic to felsic volcanic and sedimentary rocks (Osler Group) in the Nipigon Bay–Schreiber Channel area. Late Precambrian intrusive rocks include alkalic and carbonatite complexes such as the Port Coldwell Alkali Complex and the Prairie Lake Carbonatite, as well as mafic to felsic dikes.

MINING ACTIVITY

Geco Division (Noranda Incorporated)

Production from Geco Division Mine, Manitouwadge from January 1987 until October 31, 1987, included milling of 1 172 083 tons (short) at a grade of 1.75 percent copper, 4.92 percent zinc, and 1.77 ounces silver per ton.

Reserve estimates as of December 31st, 1987 are listed below.

	Tons	Cu (%)	Zn (%)	Ag (oz/t)
Main Orebody				
Proven	9 952 332	2.03	3.65	1.49
8-2 (Zinc)				
Proven	104 601	0.19	7.75	1.37
Possible	432 318	0.15	6.89	1.58
4-2 (Copper)				
Proven and possible	2 183 180	2.51	0.80	0.81
Zinc in Iron Formation	278 352	0.05	8.06	1.44

(T. Madill, Geologist, Geco Division, Manitouwadge, personal communication, 1987)

HEMLO MINES

Combined gold production from the three Hemlo mines in 1987 is estimated to be 745 000 ounces. Higher grades of ore than the published reserve figures indicated, are being processed at all three mines (The Northern Miner, November 2, 1987, p.1).

David Bell Mine (Teck–Corona Operating Corporation)

Production from the David Bell Mine for the 1987 fiscal year (October 1, 1986 to September 30, 1987) was 130 122 ounces of gold, from 359 046 tons milled, at a grade of 0.378 ounce per ton (P. Banks, Chief Geologist, Teck–Corona Operating Corporation, Hemlo, personal communication, 1987).

Golden Giant Mine (Hemlo Gold Mines Incorporated)

Production from the Golden Giant Mine for the first three quarters (January 1 to September 30) of 1987 consisted of 267 978 ounces of gold, from 650 376 tonnes milled, at a grade of 13.253 g/t (0.467 ounce per ton) (B. Kusins, Chief Geologist, Hemlo Gold Mines Incorporated, Hemlo, personal communication, 1987). Total production for 1987 is predicted to be 350 000 ounces of gold (The Northern Miner, November 2, 1987, p.1)

Page–Williams Mine

On October 2, 1987 International Corona Resources Limited won control of the Page–Williams Mine by way of an Ontario Supreme Court of Appeal ruling (The Northern Miner, October 12, 1987, p.1). Lac Minerals Limited have applied for leave to appeal to the Supreme Court of Canada, and the motion is expected to be heard in early December 1987.

Production from the Page–Williams Mine for the first three quarters (January 1 to September 30) of 1987 was 198 849 ounces of gold recovered, from 967 000 tons milled, at a grade of 0.21 ounce per ton. (P. Walford, Chief Geologist, Lac Minerals Limited, Hemlo, personal communication, 1987). Predicted production for 1987 is 265 000 ounces of gold (The Northern Miner, November 2, 1987, p.2).

DEVELOPMENT ACTIVITY

Minnova Incorporated, Winston Lake Division

Minnova Incorporated continued development in 1987 of the Winston Lake zinc-copper-silver massive sulphide deposit, with full production planned for the end of the first quarter in 1988. Underground development to date includes a 740 m shaft and 2500 m of lateral drifts and crosscuts, to access the 3.4 million ton deposit grading 16 percent zinc, one percent copper, and 0.96 ounce silver per ton (The Northern Miner, September 28, 1987, p.1). Surface development includes the erection of mine buildings, a 1000 t per day mill and construction of tailings ponds and dams. 25 000 t of ore has been stockpiled on surface.

Euralba Mining Limited—Fleck Resources Limited

Euralba Mining Limited entered into an option agreement to acquire a 51 percent interest in Fleck Resources Limited's Marathon copper-platinum group element property (George Cross News Letter Limited, October 30, 1987, p.4). Euralba is undertaking geostatistical analyses, confirmatory sampling and assaying, and grade and tonnage estimates on the deposit prior to proceeding to a final feasibility study. Further bulk sampling, metallurgical, flotation, and pilot plant testing is planned pending the results of the geostatistical report. Preliminary feasibility studies have outlined an open pit reserve of up to 53 million tons grading 0.24 g/t platinum, 0.85 g/t palladium, 0.13 g/t gold, 1.6 g/t silver, 0.02 g/t rhodium, 0.32 percent copper and 0.03 percent nickel (Activities Report, October 1987, Euralba Mining Limited).

EXPLORATION ACTIVITY

Exploration for gold, base metals, platinum group elements (PGE), rare earth elements (REE) and industrial minerals remained high in the Schreiber–Hemlo area during 1987 (Table 6.3).

GOLD EXPLORATION

1) Hemlo Area

The Hemlo area, extending from Heron Bay to White Lake, remains the most active for gold exploration. While many claims staked in the early 1980s have lapsed, they are quickly being restaked and optioned. Up to 90 percent of the metavolcanic-metasedimentary rocks remain staked in most areas.

Hemlo Gold Mines Incorporated remains the most vigorous exploration company in the area with nine active properties (*see* Table 6.3). Deep diamond drilling programs designed to obtain stratigraphic cross sections and to test for along-strike and down-plunge extensions of the main Hemlo deposit, and parallel mineralized zones are in progress on the Golden Sceptre, Interlake, and Golden Goliath properties. Results are expected to be released in early 1988.

Lac Minerals Limited continued exploration on its White River Project in Bomby, Brothers, and Laberge Townships.

Carlson Mines Limited and Black Gregor Explorations Limited have received encouragement on their 391-claim Hemlo–Marathon prospect, located 19 km (12 miles) northwest of the Hemlo Mines and 16 km (10 miles) northeast of Marathon. Gold mineralization is reported in several zones of quartz veins, shear zones, and interflow metasedimentary rocks. An 8-hole diamond-drill program was completed early in 1987. The best value was 0.14 ounce gold per ton across 1.23 m in sheared, altered, pyritic interflow metasedimentary rocks. (Resident Geologist's Files, Ministry of Northern Development and Mines, Thunder Bay).

An extensive summer program of detailed geological mapping, geochemical sampling, stripping, and trenching has just been completed. Currently, a winter road is being scouted in preparation for commencement of a 40-hole (approximately 15 000 feet)

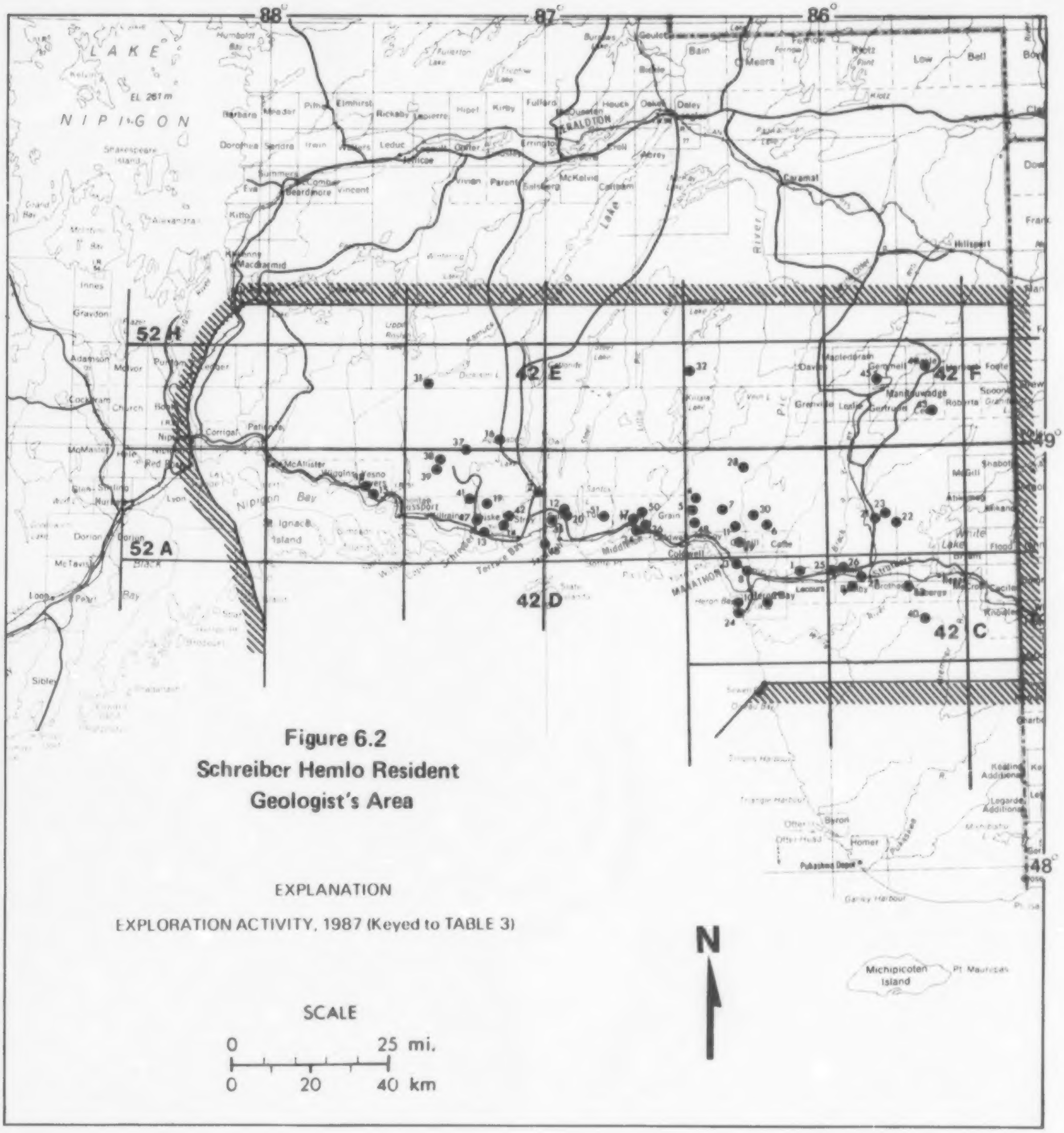
88°
87°
86°
49°
48°
LAKE NIPIGON
EL 261 m
52 H
42 E
42 F
52 A
42 D
42 C
Nipigon Bay
GERALDTON
MARATHON
Manitouwadge
Michipicoten Island
N
SCALE
0
25 mi.
0
20
40 km

Figure 6.2
Schreiber Hemlo Resident
Geologist's Area

EXPLANATION

EXPLORATION ACTIVITY, 1987 (Keyed to TABLE 3)

TABLE 6.3

EXPLORATION ACTIVITY

SCHREIBER-HEMLO DISTRICT

COMPANY/INDIVIDUAL(S)	PROPERTY NAME	TOWNSHIP/AREA	EXPLORATION
1) Armistice Resources Limited	Hemlo Property	Rous Lake Area	D.D.H.
2) Armistice Resources Limited	Terrace Bay Property	Lower Aguasabon Lake Area	Linecutting, I.P., D.D.H.
3) BP Canada Incoporated (Selco Mining & Minerals Division	McChristie Option	Pic Township	Geology, Mag, VLF prospecting, linecutting
4) BP Canada Incorporated (Selco Mining & Minerals Division	Wullie Lake Property	Seeley Lake Area	Mag, VLF, prospeting, linecutting
5) BP Canada Incorporated (Selco Mining & Minerals Division	Geordie Lake Property	Seeley Lake Area	Mag, VLF, prospecting, linecutting
6) Carlson Gold Mines/ Black Gregor Exploration Limited	Wire Lake Gold Property	North-northeast of Pic & O'Neill Townships	D.D.H., trenching, stripping, sampling
7) Duration Mines Limited	Midas Option	Seeley Lake Area	Linecutting, geology, Mag, I.P.
8) Eldor Resources Limited	Hemlo Property	Hemlo, Pic Township	D.D.H.
9) Esso Minerals Limited		Hemlo, Bomby Township	Geophysics, linecutting
10) Esso Minerals Limited		Hemlo, Pic Township	continuing exploration
11) Euralba Mining Limited/Fleck Resources Limited	Marathon Deposit	Seeley Lake Area	Sampling, assaying
12) Forerunner Resources Limited	Jackfish Property	Syine Township	Geochemistry, stripping, trenching, detailed mapping, sampling

TABLE 6.3 Continued

COMPANY/INDIVIDUAL(S)	PROPERTY NAME	TOWNSHIP/AREA	EXPLORATION
13) Forerunner Resources Limited	Gold Range Property	Priske Township	Stripping, trenching, sampling
14) Forerunner Resources Limited	Hays Lake Mine	Priske Township	Sampling
15) Fournier, Elwood	Cavers Property	Yesno Township	Prospecting, stripping, trenching, sampling
16) Golden Range Resources Incorporated	Zenmac Property	Upper Aguasabon Lake Area	D.D.H.
17) Halonen, J.	Dead Horse Creek (North) Property	Walsh Township	Trenching, sampling
18) Halonen, L.	Cavers Amethyst Property	Yesno Township Cavers	Stripping, trenching, mining
19) Halonen, P.	Little Bruin (Bear)Property	Priske Township	Sampling, road construction
20) Hamel, J.R.	Beaver Creek Property	Syine Township	Trenching, blasting, stripping, sampling, road construction
21) Hemlo Gold Mines Incorporated	Newjay Property	Hemlo (North Limb) Wabikoba Lake Area	Geochemistry, detailed prospecting, sampling, Mag
22) Hemlo Gold Mines Incorporated	Wabikoba Lake (Solong Lake Property)	Hemlo (North of Brothers Township) Wabikoba Lake Area	Geochemistry, reconnaissance mapping
23) Hemlo Gold Mines Incorporated	Shiningtree Gold Resources Option	Hemlo, Wabikoba Lake Area	Geochemistry, sampling, assaying, geology, Mag
24) Hemlo Gold Mines Incorporated	Prospect Cove Property	Pic Township, Heron Bay/Hemlo	Geochemistry, Mag, VLF, detailed mapping

TABLE 6.3 Continued

COMPANY/INDIVIDUAL(S)	PROPERTY NAME	TOWNSHIP/AREA	EXPLORATION
25) Hemlo Gold Mines Incorporated	Golden Sceptre Property	Hemlo, Bomby Lecours Townships	D.D.H.
26) Hemlo Gold Mines Incorporated	Interlake Property	Hemlo, Bomby Township	D.D.H.
27) Hemlo Gold Mines Incorporated	Goliath Gold Mines Property	Hemlo, Bomby Township	D.D.H.
28) Hemlo Gold Incorporated	Huck Lake Property	Hemlo (North of O'Neill Township)	D.D.H.
29) Hemlo Gold Mines Incorporated	Mussy Creek Property	Pic Township	Sampling, reconnaissance prospecting
30) Hemlo Gold Mines Incorporated	Page Lake Property	Hemlo, North of O'Neill/Cotte Townships	Preliminary mapping, geochemistry, sampling
31) Hibbart, N.	Greenhedge Lake Property	Dickson Lake Area	Linecutting, trenching
32) Imperial Platinum Corporation (A.C.A. Howe Limited)	Killala Lake Property	Killala Lake Area	Geophysics, VLF-E.M., Mag, detailed mapping,sampling
33) Lac Minerals Limited	White Lake Property	Brother/Laberge Townships	Continuing exploration
34) McCabe, R.	Dead Horse Creek (South) Property	Walsh Township	Stripping, trenching, sampling, shaft dewatering
35) Micham Exploration Incorporated	Empress Mine	Syine Township/ Santoy Lake Area	D.D.H.
36) Michano, D.	Dead Horse Creek Property	Walsh Township	Stripping, trenching, sampling

TABLE 6.3 Continued

COMPANY/INDIVIDUAL(S)	PROPERTY NAME	TOWNSHIP/AREA	EXPLORATION
37) Minnova Incorporated	Big Duck Lake Property	Schreiber, Pays Plat Lake Area	D.D.H.
38) Minnova Incorporated	Winston Lake Division Property	Schreiber, Pays Plat Lake Area	Geological mapping
39) Minnova Incorporated	Pick Lake Property	Schreiber, Pays Plat Lake Area	D.D.H.
40) New Beginnings Resources	Hemlo Property Oskabukuta Area	Oskabukuta Lake Area, Herrick Lake Area	D.D.H.
41) Noranda Exploration Company Limited/ Cumberland Resources Limited	Victoria Lake Property	Schreiber, Priske Township, Lower Aguasabon Lake Area	Mag. D.D.H
42) Noranda Exploration Company Limited	Schreiber Property	Schreiber, Priske Township	Prospecting, geochemistry, reconnaissance mapping
43) Noranda Incorporated (Geco Division)	Faries Lake Area Property	Manitouwadge, Cecil Township	D.D.H. geology, sampling
44) Noranda Incorporated (Geco Division)	Hucamp and Eastern Extension	Manitouwadge, Nickel, Gemmell Herbert Townships	D.D.H. reconnaissance mapping
45) Noranda Incorporated (Geco Division)	Willroy Property	Manitouwadge	D.D.H.
46) Orofino Resources Limited	Victoria Cape Property	Schreiber-Terrace Bay, Syine Township	Linecutting, geochemistry, channel sampling, detailed mapping
47) PatMikko Resources	Johnston-McKenna Property	Schreiber, Priske Township	Stripping, trenching, bulk sampling
48) St. Joe Canada Incorporated	Geordie Lake Option (MacRae Occurrence)	Coldwell, Seeley Lake Area	Linecutting, Mag, I.P., geophysics, channel sampling, stripping, detailed mapping, D.D.H.

TABLE 6.3 Continued

49) St. Joe Canada Incorporated	O'Neill Option	Seeley Lake Area	Linecutting, geology, sampling, Mag
50) Unocal Canada Incorporated	Dead Horse Creek Property	Walsh Township	Stripping, trenching, sampling, geochemistry, Rad
51) Zenmac Zinc Limited	Bozena Lake (Bonne Lake) Property	Tuuri Township	D.D.H.

ABBREVIATIONS:

D.D.H. - diamond drill hole

E.M. - Electromagnetic survey

I.P. - Induced Polarization

Mag - Magnetometer survey

Rad - Radiometric survey

VLF - Very low frequency EM survey

diamond-drill program (C. Gourley, Consultant, Carlson Mines Limited, Toronto, personal communication, 1987).

Gold mineralization in the Heron Bay and Hemlo areas occurs in a variety of environments, as exemplified by the four mineralized zones summarized for the Lytton Minerals Limited property (Peekongay Property–Heron Bay Mine) by Patterson (1986):

> "1. a pyritic, quartz-rich, molybdenite-bearing, possibly stratiform unit in mafic to intermediate tuffs ("C" Zone)
>
> 2. vuggy, pyritic quartz-carbonate veins and stringers cutting a possible subvolcanic quartz-feldspar porphyry sill ("Porphyry" Zone)
>
> 3. pyritic, silicified, and quartz-sericite-altered, dacitic pyroclastics and, to a lesser extent, mafic to intermediate tuffs (Main Zone, eastern part of North Zone)
>
> 4. quartz-carbonate veins and vein breccias with variable amounts of pyrite, chalcopyrite, galena, sphalerite, and tourmaline (Bowhill trench, 1872 shaft area trench, western part of North Zone)."

Only mineralization sub-types 1 and 2 ("C" Zone and "Porphyry" Zone) have demonstrated ore grade intersections over significant widths (2 m or greater) (Patterson 1986). Stenlund Resources Incorporated is presently being listed and plans an extensive diamond drilling program in 1988 (V. Stenlund, property owner, personal communication, 1987).

Hemlo Highway Section—Sampling Exercise

During the 1987 field season, 18 rusty, highly foliated, and schistose zones, outcropping along a 3 km section of Highway 17 adjacent to the Hemlo gold mines (Hemlo Highway Section) were sampled. Most of the zones sampled displayed gossan, and 1 percent to 10 percent pyrite mineralization. Sampled lithologies include biotite schists from the hanging wall, sericite-pyrite-green mica schists from the main mineralized zone, and biotite and chlorite schists from the footwall rocks.

The purpose of the sampling exercise was to demonstrate the elusive nature of gold mineralization, and how a greater than 80 million ton ore deposit can still be considered a "needle in a haystack". Grab samples were collected and analysed for gold (Au), molybdenum (Mo) and vanadium (V), which are considered to be pathfinder elements for Hemlo-style mineralization.

An effort was made to obtain samples from the main mineralized zone including the West Ore Zone (87BHHS-11, 12) of Teck–Corona and the eastern extension at the A-Zone open pit (87BHHS-13, 14) of Lac Minerals Minerals. Both locations have been exposed and enlarged by stripping, trenching, and water washing.

In addition, a sample of rusty drill core (87BHHS-15) from 1940s drilling by Lake Superior Mining Corporation (possibly) was collected near

Highway 17. The analytical results of all the samples are displayed in Table 6.4.

Page (unpublished report, 1948, Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay) considered the Hemlo Fault to be the most important structural feature in the Hemlo area. He described the Lake Superior Shear Zone as being up to 100 feet wide, north of the Hemlo Fault, and over seven miles in length. Page (1948) considered the Hemlo Fault to bear a close relationship to the Lake Superior Shear Zone and noticed a strong similarity in the petrologic assemblage between the two structures.

Bartley (unpublished report, 1957, Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay) described a fault zone composed of many parallel faults which the highway follows for four miles between Cedar Creek and Hemlo. He stated that a few quartz veins and several quartz-sericite shear zones carried substantial gold values.

The sampling exercise involved the collection of rusty schistose rocks from slightly east of Cedar Creek to Moose Lake. This 3 km Hemlo Highway Section is interpreted to lie within the fault zone described by Bartley (1957).

Results indicate an enrichment of gold, molybdenum, and vanadium in the main mineralized zone (87BHHS-11-14), however, only two economic values were realized from 19 samples.

Away from the main mineralized zone, all samples indicated less than 0.01 ounce gold per ton. This is remarkable if the amount of gold in the immediate vicinity is considered. While this sampling exercise was not designed to be highly technical, the following observations and conclusions can be made:

1) Although many pyritic, schistose zones are present, only the main mineralized zone returned economic gold values from the initial sampling.
2) The gold values obtained from the main mineralized zone varied dramatically and must be considered erratic. Exposure of the mineralized zone prior to 1980 was considerably poorer.
3) Gold (Au) appears to be "its own" best pathfinder element.
4) The schistose footwall zones appear more enriched in gold than the hanging wall zones.
5) Limited reconnaissance sampling over a 3 km section of Highway 17 near Hemlo, could easily produce no economic gold values.
6) Exploration programs which incorporate two-dimensional stripping, trenching, and abundant sampling, including lithogeochemical surveys (in ppb) would appear to be most effective.

Upper Barren Sulphide ("Sucker") Zone

On the south side of Highway 17, near the turnoff to the David Bell Mine, is an exposure of thinly layered, biotite-muscovite-(sericite)-quartz-feldspar schist, locally containing up to 10 percent pyrite. A sedimentary or tuffaceous protolith is suggested. Pyrite occurs both as thin, foliation-parallel bands and within dark, plumose to patchy zones adjacent to the bands.

Sodium cobaltinitrate staining on a hydrofluoric acid-etched slab reveals that potassic minerals (biotite, muscovite, sericite, potassic-feldspar) occur in thin, discrete foliation-parallel bands. These minerals are also disseminated in amounts of <3 percent throughout the rest of the rock and within the patchy sulphide zones.

Thin section study reveals that a lepidoblastic texture (parallel orientation) is developed in lath-like muscovite and biotite. The majority of the rock consists of granoblastic, fine-grained plagioclase, alkali feldspar, and quartz. Mechanical twins are sporadically developed in plagioclase ("chessboard" albite).

Net-textured pyrite comprises the dark alteration haloes around foliation-parallel pyrite seams and occurs interstitially to the silicate grains. These dark haloes may extend up to 1 cm from the "parent" pyrite seam and are themselves enveloped by a lighter-coloured (quartz-rich) halo. Sulphide replacement of the silicates is apparently an incipient alteration feature, superimposed on the metamorphic minerals and fabric. It is presumably related to fluid migration and sulphide mobilization from the foliation-parallel pyrite seams. The relative timing of the pyrite mineralization and mobilization is still unresolved.

2) Schreiber–Terrace Bay Area

Exploration for gold remains active in the Schreiber–Terrace Bay area, (*see* Table 6.3) including the Big Duck Lake area where Minnova Incorporated continued their multi-year exploration program. In 1987, Minnova Incorporated completed 2100 m of diamond drilling designed to test for gold mineralization at the contact between the metavolcanic rocks and Big Duck Lake porphyry.

The western contact of the Terrace Bay Batholith is presently 85 percent staked, and includes at least seven known gold occurrences (*see* Patterson *et al.* 1986) which are being actively explored. Forerunner Resources Limited have optioned the Gold Range and Hays Lake properties, and conducted trenching, stripping, and sampling, with further exploration, including diamond drilling, scheduled for 1988. The exploration program is designed to test the Terrace Bay Batholith—metavolcanic/metasedimentary rocks contact aureole.

Schreiber Pyramid Property

The Schreiber Pyramid property is located in Priske Township approximately 6 km northeast of Schreiber, on the northeast side of Big Duck River. The geological setting and mineralization are similar to the McKenna–McCann and Johnston–McKenna properties described in Patterson *et al.* (1986, and 1987). In addition, mafic to intermediate fragmental metavolcanic rocks, oxide-facies iron formations, gabbros, and a lamprophyre dike are present.

Banded magnetite-chert iron formations, up to 3 m thick, strike 140° and dip 82°E, displaying folding and soft sediment slump features. The iron formations are hosted by mafic to intermediate heterolithic fragmental metavolcanic rocks, including tuffaceous units.

TABLE 6.4

HEMLO HIGHWAY SECTION - SAMPLING EXERCISE ANALYTICAL RESULTS

SAMPLE NO.	DESCRIPTION/LOCATION	Au(ppb)	Au(oz/t)	Mo(ppm)	V(ppm)
87BHHS-1	Cedar Lake Pluton, biotite-rich medasedimentary rock contact, 1-2% pyrite Hanging wall	<2	<0.01	nil	30
87BHHS-2	Foliated metasedimentary rocks, hanging wall near contact with Cedar Lake Pluton and porphyry, 1% pyrite	<2	<0.01	11	82
87BHHS-3	Biotite-rich mafic metasedimentary rock, 5% pyrite, hanging wall	<2	<0.01	nil	348
87BHHS-4	Sulphide zone at contact between biotite-rich metasedimentary rocks and porphyry dike, hanging wall 1-2% pyrite	<2	<0.01	21	61
87BHHA-5	East of Yellow Brick Road, turnoff, sulphide-rich, mafic metasedimentary rock foliated, shear zone hanging wall, <1% pyrite	7	<0.01	nil	61
87BHHS-6	West of Cedar Creek, buff brown metasedimentary rock, minor quartz veins, hanging wall, <1% pyrite	<2	<0.01	nil	81
87BHHS-7	East Barren Sulphide ("Sucker") zone (south side of highway) 2% pyrite, hanging wall metasedimentary rock.	7	<0.01	nil	26
87BHHS-8	West or Main Barren Sulphide ("Sucker") zone hanging wall pyrite 5-10%, aluminosilicate minerals, mica-sericite schist	11	<0.01	nil	88
87BHHS-9	Hanging wall, west of Barren Sulphide ("Sucker") zone, altered metasedimentary rock, feldspar-rich, 1-5% pyrite	12	<0.01	nil	79

TABLE 6.4 Continued

87BHHS-10	Hanging wall, strong by foliated metasedimentary rock, sulphide zone, 2-5% pyrite	7	<0.01	nil	25
87BHHS-11	West ore zone, highway pendant, contact with porphyry dike (15% pyrite) sericite-rich fragmental rock, schistose	24,350	~.70	550	543
87BHHS-12	West ore zone, highway green mica and molybdenite visible, mica-sercite schist Lake Superior shear zone, 10% pyrite	6,350	0.18	549	347
87BHHS-13	East of Page-Williams Open Pit, Teck-Corona property trenches, narrow ore zone, sericite zone, 10% pyrite	2,270	0.07	105	132
87BHHS-14	East of Page-Williams A-zone, fragmented, sericite alteration, 15% pyrite, abundant green mica	1,170	0.03	99	143
87BHHS-15	1950's diamond drill core sample, south of Highway 17, rusty metasedimentary rocks unsplit	70	<0.01	12	73
87BHHS-16	Footwall, sulphide zone near Moose Lake, 5% pyrite	4	<0.01	nil	26
87BHHS-17	Footwall, near Moose Lake mafic metasedimentary rocks, 5% pyrite	37	<0.01	nil	83
87BHHS-18	Footwall, mafic metasedimentary rocks and minor molybdenite, 5% pyrite	5	<0.01	nil	43
87BHHS-19	Footwall, across from Page-Williams Road, tuffaceous, 10% pyrite	29	0.01	nil	185

TABLE 6.5

SCHREIBER PYRAMID ANALYTICAL RESULTS

SAMPLE NO.	Au(oz/t)	Ag(oz/t)	Cu(%)(ppm)	Zn(ppm)	Pb(ppm)	DESCRIPTION
87BSP-1	0.42	0.09				No.1 vein, 10 lb. bulk-grab sample
87BSP-2	0.04	4.47	17.5%	7.10%	33	Sulphide-rich zone, chalcopyrite rich, 40% sulphides
87BSP-3	0.05	0.99	5.05%	1.32%	365	Sulphide-rich zone, py-po rich
87BSP-4	<0.01	<0.10	1560	2720	202	Schreiber-Pyramid, gossan-rich zone
87BSP-5	<0.01	<0.10	870	660	94	Hostrock to sulphide zone fragmental
87BSP-6	0.01	<0.10	...	...	...	carbonatized-silicified host rock (metavolcanic)
87BSP-7	0.86	0.35	...	...	...	No.1 or Cabin vein, visible gold noted

Base metal mineralization is hosted within two parallel sulphide-rich, schistose zones which strike 140° and dip nearly vertically. The zones are up to 0.5 m thick and are hosted by mafic metavolcanic rocks, tuff, and gabbro. They are parallel to the cleavage which is slightly oblique to the bedding (128°) in this area. The mineralized zones consist of up to 40 percent sulphides, including pyrite, pyrrhotite, and sphalerite. Selected grab samples of the sulphide-rich zone are displayed in Table 6.4.

Gold mineralization at the Schreiber Pyramid No.1 vein occurs within a narrow, 20 to 60 cm wide quartz vein which strikes 100° and dips 53°S (Harcourt 1939). The crack-seal vein, which is similar to veins at the McKenna–McCann property, is hosted by mafic metavolcanic rocks and a lamprophyre dike, and appears offset by northeast-trending faults. The veins on the property are subparallel to a major northwest-trending lineament, occupied by the Big Duck River and interpreted to represent a major fault. Mineralization consists of pyrite, chalcopyrite, malachite, and visible gold, the latter commonly occuring as fine-grained gold along chlorite-sericite seams or slickensides, within the vein. The host rocks display silicification and carbonatization.

Analyses are displayed in Table 6.5.

The Schreiber Pyramid property is currently held by G. Stanky of Thunder Bay.

JACKFISH PROPERTY

Forerunner Resources Limited conducted geological mapping, stripping, trenching, and sampling on their Jackfish property (Elgin, Beavercreek (Hamel–Doyan), Ferguson, and Siville–Ferrier properties).

The Beavercreek Occurrence, a composite quartz vein, is hosted by a talc-chlorite schist. The schistose zone strikes 090° and dips 56° to 74°N and is locally up to 4 m wide, while individual quartz veins within the schistose zone vary in width up to 0.30 m and display tight isoclinal folding. The rocks have been intruded by several generations of felsic porphyry dikes.

Mineralization consists of galena, chalcopyrite, pyrite, and possibly tellurides. Selected grab samples assayed up to 2.72 ounces gold per ton, 3.18 ounces silver per ton, 1.20 percent copper, 7.85 percent lead, and 0.49 percent zinc (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). Diamond drilling is scheduled for 1988.

BASE METAL EXPLORATION

Exploration for base metals was active in three general areas:

1) Winston Lake Area: Minnova Incorporated continued exploration in the Winston Lake area, which includes the Pick Lake zone considered to represent a parallel satellite sheet deposit. Noranda Exploration Company Limited in joint venture with Cumberland Resources Limited conducted diamond drilling on alteration/stratigraphic targets in the Victoria Lake area.

2) Santoy Lake–McKellar Lake Area: Zenmac Zinc Limited recently diamond drilled on the Bozena (Bonne) Lake zinc/gold property in Tuuri Township. Previous drilling by Gulf Minerals Canada Limited in 1983 intersected encouraging zinc values.

3) Manitouwadge Area: Geco Division (Noranda Incorporated) is actively exploring for base metals in the Manitouwadge area. Diamond drilling is being undertaken on the Faries Lake property, Cecil Township, and the Hucamp and Eastern Extension properties east of the Geco Mine. Underground diamond drilling in 1988 at the Willroy Mine property will test for down-plunge extensions of mineralized zones.

PLATINUM GROUP ELEMENTS EXPLORATION

ALKALINE COMPLEXES

Exploration activity in the Coldwell and Killala Lake Alakaline Complexes increased in 1987, spurred by the recent discovery and development of copper and platinum group element (PGE) occurrences, namely the Marathon Cu–PGE Deposit (Euralba Mining Limited–Fleck Resources Limited) and the MacRae Cu–PGE Occurrence (St. Joe Canada Inc., Giant Bay Resources Limited, Geordie Lake Option).

A number of other companies, including Duration Mines Limited, BP Canada Incorporated (Selco Mining and Minerals Division), and Imperial Platinum Corporation have contributed to the local resurgence in PGE exploration. Claim staking activity in the Coldwell Alkaline Complex is concentrated in two main areas. Virtually all of the Eastern or Border Gabbro along the northern and eastern margins of the Complex are staked, as are the gabbroic rocks south of Coubran Lake, in the centre of the complex.

In the Killala Lake Complex, recent exploration activities have focused on the peripheral gabbros where copper and nickel mineralization had been previously discovered and investigated.

RARE EARTH ELEMENTS EXPLORATION

Although occurrences of rare earth elements (REE) in the Schreiber–Hemlo area have been investigated since the 1950s, no significant development work has been undertaken due largely to market uncertainty. Recent exploration and assessment of REE mineralization in the Dead Horse Creek area by Unocal Canada Limited has prompted renewed prospecting interest in this commodity. REE occur in two basic settings in the district: 1) syenitic dikes within the Coldwell Alkaline Complex, and 2) diatremes or explosion breccias proximal to the Coldwell Complex. The Coldwell Complex and the diatremes are Late Precambrian (Proterozoic) in age and are both related to alkalic rock magmatism of that period (Sage 1982). A general discussion of rare earths can be found in this volume under Kennedy and Sherlock.

1) Coldwell Complex Syenite Dikes

This type of REE occurrence was first prospected in the 1950s for uranium and columbium (niobium). Geological mapping, radioactivity surveys, prospecting, and trenching disclosed a number of REE-bearing syenite dikes within the Coldwell Complex between Coubran Lake and Lake Superior, near Port Munro and Beatty Cove. These dikes include the Marathon, Gustafson (Port Munro), Johnson, Potvine, and Orchan Columbium occurrences. The Gustafson occurrence is presently held by P. Moses of Heron Bay.

The syenite dikes are radioactive and returned average assay values of 0.1 to 1.5 percent Nb_2O_5, 0.01 to 0.15 percent U_3O_8, and <0.5 percent ZrO_2. Thorium and cerium values are apparently highly variable, ranging from trace amounts to 3.0 percent ThO_2, and 12.0 percent Ce (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

2) Diatreme-hosted REE

Diatreme structures at McKellar Creek and Dead Horse Creek have been described by Sage (1982) as hosts for uranium, thorium, beryllium, and REE mineralization. The west Dead Horse Subcomplex, presently under option to Unocal Canada Limited, was visited by staff of the Ministry of Northern Development and Mines, Mines and Minerals Division, Thunder Bay, in 1987 and is briefly described below.

The west Dead Horse Subcomplex diatreme is approximately 40 m by 80 m in size and occurs in strongly foliated Archean metasedimentary rocks and foliation-parallel feldspar porphyry dikes. There are three main, highly radioactive showings: 1) western pits, 2) eastern pits, and 3) eastern extension.

The western pits are situated on a narrow, mineralized structure striking at 130°, oblique to the foliation of the host rocks, west of the main diatreme. The mineralization is hosted in a highly silicified, hematized, calcitic rock. The narrowness of the mineralized zone suggests that it may be a fault zone or perhaps a later, carbonatitic dike.

The eastern pits are situated in the main diatreme which contains dominantly monolithic, hematized clasts in a carbonate-rich matrix. The eastern extension consists of a strongly hematized, monolithic to heterolithic breccia.

The REE occur predominantly in silicate minerals, in association with calcite, hematite, quartz, and epidote. The ore mineralogy consists of:

thorite ($ThSiO_4$)
alunite ($KAl_3(SO_4)_2(OH)_6$)
xenotime (YPO_4)
zircon ($ZrSiO_4$)
pyrochlore ($(Na,Ca)_2(Nb,Ta)_2O_6(OH,F)$)
eudialyte ($Na_4(Ca,Fe^{2+})_2ZrSi_6O_{17}(OH,Cl)_2$)
phenakite (Be_2SiO_4)

(A. Knox, Exploration Geologist, Unocal Canada Limited, personal communication, 1987).

The mineralized zone gives scintillometer readings of greater than 140 times background and contains <12 percent Zr, >0.1 percent Y_2O_3, and up to 500 ppm Sc (A. Knox, Exploration Geologist, Unocal Canada Limited, personal communication, 1987).

EXPLORATION GUIDELINES

1) GOLD

The metavolcanic and metasedimentary rocks which wrap around the Heron Bay, Gowan Lake, and Cedar Lake plutons are considered to have excellent potential for gold mineralization. Metavolcanic-metasedimentary contacts, porphyry contacts, the presence of pyritic, sericite schists, disseminated pyrite mineralization, molybdenite, green mica, barite, and pervasive potassic alteration (microcline and muscovite/sericite) are considered to be important in characterizing gold mineralization in the Hemlo area.

Recent exploration results by Carlson Mines Limited—Black Gregor Explorations Limited in the Wire Lake area suggest that the Cirrus Lake–Goodchild Lake–Veronica Lake (Milne 1967) area requires further exploration. Re-analyses of lake bottom sediment samples from a 1970s survey by the Geological Survey of Canada was performed as part of an orientation study to evaluate lake sediments for precious metals concentration. Samples from three lakes east to south of Goodchild Lake, namely Budall, a small lake approximately 1.6 km (1 mile) east of Budall, and Fallen Lake, indicate anomalous gold values and an association of gold, chromium, and nickel, and to a lesser extent zinc, silver, and cadmium (P. Friske, Exploration Geochemistry Subdivision, Geological Survey of Canada, Ottawa, personal communication, 1987). Felsic intrusive rocks in the Veronica Lake area and southwest of Goodchild Lake are recommended targets.

The northwest contact aureole at the Terrace Bay Batholith is considered an excellent gold exploration target. The exploration model presented in Patterson *et al.* (1987) suggests one possible approach to this area. Felsic intrusive rocks including porphyry and aplite dikes are abundant proximal to the Terrace Bay Batholith and display potassic alteration and elevated gold levels. Preliminary sampling of an aplite dike on the Hays Lake property indicated 0.05 ounce gold per ton. Exploration programs on narrow, high-grade, structurally controlled veins such as the Johnston–McKenna, McKenna–McCann, and Schreiber Pyramid properties should make use of the prospectors' tool of the 1980s, the backhoe, and include two-dimensional stripping and trenching. Small-scale mining operations could consider optical sorting methods for these vein types.

The Big Duck Porphyry and contacts with the metavolcanic rocks have a high potential with more than 20 known gold occurrences present in a 6 km by 3 km area. Structural controls combined with potassic alteration are suggested as indicators of gold mineralization.

2) BASE METALS

Winston Lake Area: Calc-alkalic intermediate to felsic metavolcanics are considered to have a high base metal potential in this area. The metavolcanics consist of pyroclastic flows, debris flows, and laminated ash deposits. Intense hydrothermal alteration of these and associated metavolcanics have been responsible for the misidentification of such indicator rocks.

Lithogeochemical surveys which indicate sodium and calcium depletion and magnesium, potassium, and zinc enrichment are considered valuable exploration tools for identifying hydrothermal alteration zones associated with base metal, massive sulphide deposits.

Lyne Lake–Victoria Lake Area: The author considers the Lyne Lake–Victoria Lake metavolcanic-metasedimentary rocks to represent an extension of the Winston Lake stratigraphy which has been separated by granitic intrusions. Calc-alkalic and felsic fragmental metavolcanic rocks are considered excellent exploration targets.

Santoy Lake–McKellar Lake Area: A large felsic metavolcanic unit trends west-northwest and hosts numerous base metal occurrences including the Marlhill, Goldbar Lake, Bozena (Bonne), Prairie West, Alvey, and Granite Mountain properties. Felsic pyroclastic flows were observed in the Granite Mountain area. These clast-supported flows contained considerable garnet mineralization in the matrix component. Copper and zinc enrichment combined with sodium depletion were noted in deformed metavolcanic rocks in the Marlhill area. Felsic metavolcanics in the Fishnet Lake area have been mapped as "andalusite-bearing tuffs" by Walker (1967) and may represent hydrothermally altered rocks. Iron formation and the related chemical and clastic metasediments commonly contain anomalous zinc, lead, copper, silver, and gold concentrations and should be explored.

Pic River Area (Page Lake–O'Neill Township): The economic potential for gold and base metals is considered high in the felsic metavolcanic rocks and at contacts with these rocks in the Page Lake area. Patterson (1984) described the Knut Kuhner Occurrence:

> "The geology of the property was mapped by Milne (1967). It is underlain by felsic pyroclastic rocks on the west and mafic metavolcanics on the east. Metasediments, graphitic schists, pelites, cherts, and massive sulphides occur between the felsic and mafic metavolcanics. A lake bottom sediment geochemistry sampling program (Geological Survey of Canada, Open File Report 746) shows a large copper, lead, zinc, and mercury anomaly, similar to the anomaly at Manitouwadge, centred on Page Lake.
>
> In 1983, drill logs with complete assays, from an exploration program by Kerr Addison Mines Limited in 1971, were added to the Resident Geologist's Files; Ontario Ministry of Natural Resources, Thunder Bay. The best results were for drillhole KP-71-5 which intersected 18.2 feet of 0.08 ounce gold per ton and 1.16 percent Zn.
>
> The mineralization encountered occurs as pyrrhotite, sphalerite, and pyrite hosted in felsic metavolcanics.
>
> Airborne geophysics done by Shell Canada Resources Limited in 1977 shows a number of EM conductors (Resident Geologist's Files; Ontario Ministry of Natural resources, Thunder Bay."

Manitouwadge Area: The limbs of the Manitouwadge Syncline and the extensions of the Manitouwadge stratigraphy into Gemmell, Nickel, and Hebert Townships, as well as to the north of those townships are considered high potential areas. The metavolcanic-metasedimentary limbs have been extremely disrupted and intensely deformed, and subjected to amphibolite grade metamorphism and hydrothermal alteration. Consequently, these rocks can be obscurred, and are difficult to identify as exploration targets. The presence of sillimanite, cordierite, garnet, and anthophyllite is indicative of hydrothermal alteration and/or high grade metamorphism. Most known ore deposits are hosted by muscovite-quartz schist.

PLATINUM GROUP ELEMENTS

Exploration for platinum group elements (PGE) mineralization in the Schreiber–Hemlo area should be concentrated in five major areas: 1) the Coldwell Alkaline Complex; 2) the Killala Lake Alkaline Complex; 3) the Goodchild Lake area; 4) the Rhea Lake–Hornblende Lake area; and 5) the Jackfish area.

The Coldwell and Killala Lake Alkaline Complexes are currently being explored for PGE. Cursory studies of Cu-sulphide + PGE mineralization have cited characteristic parameters that may aid exploration. Cu- and PGE-rich sulphide concentrations locally occur in gabbroic rocks (Patterson *et al.* 1987; Coates 1970). The gabbroic rocks commonly display evidence of magma mixing, alteration, and multiple intrusive events. Sulphides occurring in breccias, dikes, pegmatites, veins, and altered portions of the gabbro should be sampled and assayed for PGE. The rocks in the Goodchild Lake, Rhea Lake–Hornblende Lake, and Jackfish areas are Archean metavolcanics and mafic to ultramafic intrusive rocks with which copper-nickel sulphides are associated. It is suggested that PGE mineralization may be associated with these Cu-Ni sulphides. In the Goodchild Lake area, sulphides occur in an altered metavolcanic body (Milne 1967). The Nicopor Mines Cu-Ni occurrence is situated in amphibolitized metavolcanic rocks and gabbros along a contact with a granite in the Rhea Lake area (Bartley 1939). Gabbro, diorite, hornblendite, and derived amphibolite occur within a metavolcanic belt in the Jackfish area (Walker 1967). References have been made to a platinum discovery made near the turn of the century by a Captain Pritchard (Daily Times–Journal, Fort William, Ontario, September 6, 1919). It is also noted by Downey (1985):

> "Early in the century, Captain Pickett (sic) was prospecting north of the old Ursa Major mine. He brought out samples of pyrrhotite, left them in Schreiber...When the samples of pyrrhotite were assayed, it was found they ran very high in platinum, around a hundred dollars a ton."

Market prices for platinum at that time ranged from ten to thirty dollars (U.S.) per troy ounce.

RARE EARTH ELEMENTS

Exploration for rare earth elements should concentrate on: 1) syenitic dikes, and 2) diatreme structures in and around the Coldwell Alkaline Complex. Potential targets are invariably radioactive and are most easily discerned using a portable scintillometer or geiger counter. Pervasive hematization and silicification are associated with diatreme-hosted mineralization. Calcite and epidote are common accessory minerals.

THUNDER BAY DRILL CORE LIBRARY

SCHREIBER–HEMLO AREA

A total of 8173 m of diamond-drill core was collected from eleven properties in the Schreiber–Hemlo area to be catalogued and stored at the Thunder Bay Drill Core Library. These collections provide a permanent record of both geologically representative and geologically unique sections for the area. Of particular interest is core retrieved from Score Resources Limited's White Lake Property east of the main Hemlo drilled zone in 1983; Lincoln Resources Incorporated's Armstrong Option which provides an excellent representation of the stratigraphy and mineralization for the Priske Township area; Petrostates Resource Corporation's Molson Lake Property which tested the contact zone of the Cedar Lake Pluton and surrounding metasediments; Unocal Canada Limited's Dead Horse Creek Property known for its radioactive mineralization and rare earth potential; and Fleck Resources Limited's Marathon Property drilled in 1985–1986 for platinum group elements. Drill core from these five properties has been examined, enabling a detailed interpretation for each.

1) White Lake Property (McCron Township) Score Resources Limited through Manwa Exploration Services Limited completed a 475 m, 7-hole diamond-drill program in August of 1983. The property is comprised of 23 contiguous staked claims and is located approximately 27 km due east of the Hemlo mines area. The host rock generally consists of well-laminated, highly schistose intermediate to felsic metatuffs and flows. Intense alteration zones evident in the core, are primarily associated with the granodiorite intrusion which outcrops in the northeast portion of the property. These zones are recognized by garnet/epidote-rich biotite-talc-sericite schists which are intensely chloritized and silicified. Sulphide mineralization consists primarily of one percent to three percent disseminated pyrite and pyrrhotite, and up to five percent over 20 m in places. Trace to one percent molybdenite and sphalerite were also noted. Occasionally these rocks are intruded by narrow quartz-feldspar porphyry and fresh medium-grained diabase dikes. Anomalous gold values obtained by the company from sampled core sections appear related to the more felsic alteration zones (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay.)

2)Armstrong Property (Morley Claims, Priske Township) In January of 1986 a 4-hole diamond-drill program was initiated and completed on Lincoln Resources Incorporated's Armstrong Option Property, located 4 km southeast of the town of Schreiber. Three holes totalling 327 m were selected and stored at the Thunder Bay facility, providing a good representation of the stratigraphy and mineralization of the area. Detailed examination of the diamond-drill core re-

TABLE 6.6

THUNDER BAY DRILL CORE LIBRARY SUMMARY, 1987

PROPERTY NAME	COMPANY	LOCATION (Area, Twp)	NO. OF DDH's	TOTAL DRILLED (meters)
SCHREIBER-HEMLO				
1. Empress Project	Micham Exploration Inc.	Syine Twp.	10	1,600
2. Millroad Project	Armistice Resources Ltd.	Lower Aguasabon Lake Area	1	125
3. Zenmac Project	Gold Range Resources	Schreiber Area	14	1,325
4. Nexus/Contact Property	Noranda Exploration Co. Ltd.	Pic Twp.	5	1,129
5. Youngman Oil & Gas Limited Property	Gold Fields Canadian Mining Limited	Lecours Twp.	3	1,268
6. Oskabukuta River Property	New Beginnings Resources Inc.	Oskabukuta River Area (south of White Lake Provincial Park)	12	73 (Assessment core)
7. White Lake Property	Score Resources Limited	McCron Twp.	6	452
8. Armstrong Property (Morley Claims)	Lincoln Resources Inc.	Priske Twp.	3	327
9. Molson Lake Property	Petrostates Resource Corp. (Rose Resource Corp.)	Brothers Twp.	1	825
10. Dead Horse Creek Property	Gulf Minerals Canada Ltd.	Walsh Twp.	8	1,024
11. Marathon PGE Property	Fleck Resources Ltd.	O'Neill Twp.	3	25

veals an overlying assemblage of sulphide-rich chemical metasedimentary rocks from approximately 8 m to 40 m, and an underlying moderately silicified intermediate to felsic volcaniclastic unit. The chemical and associated clastic metasedimentary rocks are comprised mainly of massive (rarely bedded) black siliceous chert-rich argillite (from 0.5 to 7 m thick), banded semi-massive to massive sulphides (pyrite and pyrrhotite) and a recrystallized chert. The underlying felsic metavolcanic rocks consist primarily of fine- to medium-grained tuffs (highly siliceous with potassic alteration in places) and volcanic breccia with fragments up to 4 cm in size. Pyrite occurs as disseminations and seams averaging from one to two percent and ranging up to five percent. Quartz-calcite veining predominates throughout both rock units. Late diabase and quartz feldspar porphyry dikes are restricted mainly to the upper metasedimentary package. Although gold values in the metasediments were insignificant, zones of silicification and intense shearing within the felsic metavolcanics yielded gold values of 520 ppb and 2.2 ppm respectively (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

3)Molson Lake Property (Brothers Township) In November of 1985, Petrostates Resource Corporation (formerly Rose Resource Corporation) drilled a single hole totalling 825 m to test the contact zone between the Cedar Lake Pluton and the surrounding metasedimentary rocks for gold content. The 20-claim property is centred over Little Cedar Lake in the northwest corner of Brothers Township, approximately 1.5 km southeast of the junction of the Trans-Canada Highway and Highway 614 to Manitouwadge.

A description by N. Caira in 1985 (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay, summarizes the drillhole geology as follows:

> "The drilling on the southeast shore of Little Cedar Lake intersected the Cedar Lake Pluton granodiorite for a total length of 1532' with intermittent syenite and chloritic dikes. The grandioritic rocks were locally cut by chalcopyrite- and pyrite-bearing quartz veins. The grandiorite was followed by metasediments consisting of a quartz-biotite schist, impure arenite sequence with intermittent calcsilicate bands containing up to one percent pyrrhotite and trace pyrite, and purple fluorite-calcite-silica bands containing trace amounts of disseminated pyrite. Several bleached, silicified zones occur within the metasediment sequence often associated with micro quartz stringers."

The granodiorite comprising the Cedar Lake Pluton is equigranular in nature and is characterized by zones of pervasive hematization, epidote alteration, and occasional fine-grained xenoliths of gabbroic composition (up to 6 cm in diameter). The metasediments have been altered to a quartz-biotite schist containing minor interbeds of light-green crystal tuff and rare bands of rose-coloured garnet porphyroblasts. No geochemical results are presently available from sampled core sections across the contact zone.

4)Dead Horse Creek Property (Walsh Township) Gulf Minerals Canada Limited completed an 8-hole, 808 m diamond-drill program in November of 1978 on a 25-claim block covering the Dead Horse Creek Diatreme (all drill core is presently stored at the Thunder Bay facility). The property is located 3 km north of Highway 17 on the Dead Horse Creek Road, approximately 45 km east of Terrace Bay. It is currently (October 1987) under option from J. Ternowsky, Thunder Bay, to Unocal Canada Limited.

The diatreme or explosion breccia occurring within this property is important for its known radioactive mineralization (uranium, thorium, and beryllium) and rare earth potential. Sage (1982) describes the Dead Horse Creek structure in some detail, which is consistent with, and clearly represented by the drill core. Of economic importance are the angular diatreme breccia clasts (up to 90 cm but averaging 25 cm in diameter) consisting primarily of metasediment and less abundant metavolcanic, quartz-monzonite, syenite, and diabase fragments (representing Late Precambrian dike rocks), in a fine quartz-carbonate-rich matrix. The clasts range from dark green and black to brick red in colour, indicating intense hematization and silicification. Pale to dark red reaction rims demonstrate weak to moderate hematization. At the present time, the results of geochemical analysis are not available, however, a correlation has been established between intense alteration and intense radioactive mineralization (Sage 1982).

5)Marathon PGE Property (O'Neill Township) Fleck Resources Limited conducted an extensive surface exploration and diamond-drill program for platinum group elements in 1985 and 1986 on its Marathon property. A compressed stratigraphic section from 3 drill holes was donated to the Thunder Bay Drill Core Library by the company. Fine-grained, layered and massive gabbro, coarse-grained pegmatitic gabbro, and metavolcanic xenoliths are represented in the section. A detailed description of the property geology and mineralization is given by B.R. Schnieders in Patterson *et al.* (1987).

ONTARIO MINERAL EXPLORATION PROGRAM

During 1987, OMEP assisted six designated programs, with a total expenditure of approximately $265 000. in the Schreiber–Hemlo area.

GEOLOGICAL RESEARCH

ONTARIO GEOLOGICAL SURVEY

T.L. Muir and C.G. Elliot continued a tectono-stratigraphic study of the a rea around the three mines (Hemlo Highway Section). Structural evidence indicated four generations of structures and at least two deformation events including two periods of isoclinal folding (F_1 and F_2) and mylonitization. The F_3 event includes the development of pervasive small-scale Z folds and discrete zones of intense dextral shear. The final stage F_4 involved the waning periods of dextral shear, combined with the production at layer-parallel breccias, pseudotachylites, brittle faults, and late stage kinks. The main Hemlo ore body plunges parallel to L_2 lineations and F_2 axes within the mineralized zone (T. Muir, Geologist, Ontario Geological Survey, Precambrian Section, Toronto, personal communication, 1987).

R. Sutcliffe and A. Smith conducted mapping of Proterozoic igneous rocks in the Thunder Bay area, including St. Ignace Island.

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

Y. Pan (M.Sc. candidate, University of Western Ontario, London, Ontario) in conjunction with M. Fleet is conducting a metamorphic petrology study of the White River gold prospect.

J. Burton (M.Sc. candidate, Lakehead University, Thunder Bay, Ontario) in conjunction with P. Fralick, is conducting research into the formation of placer accumulations in braided streams on the north shore of Lake Superior.

T.C. McCuaig (M.Sc. candidate, Lakehead University, Thunder Bay, Ontario, Grant 300) in conjunction with S.A. Kissin, is conducting a study on the genesis of silver veins in the Thunder Bay and Marathon areas.

OTHER RESEARCH

E. Peterson (University of Utah) is continuing research on the alteration and petrology of the Geco ore body, Manitouwadge, Ontario.

P. Fralick (Lakehead University, Thunder Bay, Ontario) and T.J. Barrett (IREM-MERI McGill University) are continuing research on the Morley Pyrite Occurrence and Archean sulphide-facies iron formation with comparisons to ocean hydrothermal systems.

P. Fralick, T.J. Barrett, and I. Jarvis conducted a rare earth element geochemical study of Archean iron-formations north of Lake Superior (Beardmore–Geraldton and Schreiber–Terrace Bay areas). In addition, research on the rare earth geochemistry of the barite deposits near Hemlo is being conducted.

P. Friske, Geological Survey of Canada, is conducting a lake bottom sediment geochemical survey in and around the Coldwell Alkaline Complex.

R.H. Mitchell and R.G. Platt (Lakehead University) are continuing research on the petrology of the Coldwell Alkaline Complex.

UNIVERSITY THESES

S. Osterberg (Ph.D. candidate, University of Minnesota–Duluth) is conducting a stratigraphic-alteration study of the Winston Lake stratigraphy, Schreiber, Ontario.

B.R. Schnieders (M.Sc. Lakehead University, Thunder Bay, Ontario) completed a M.Sc. thesis entitled "Geology of Sulphide–Facies Iron–Formation and Associated Rocks in the Lower Steel River–Little Steel Lake Area, Terrace Bay, Ontario."

D. Laderoute (M.Sc. candidate, Lakehead University, Thunder Bay, Ontario) is continuing a petrologic and geochemical study of dike rocks in the Coldwell Alkaline Complex.

K. Thompson (M.Sc. candidate, Lakehead University, Thunder Bay, Ontario) is continuing a study on sedimentology of clastic and chemical rocks in the Heron Bay–White Lake area.

J. Lukosius-Sanders (M.Sc. candidate, Lakehead University, Thunder Bay, Ontario) continues a petrologic study of quartz syenites of Centre 3, Coldwell Alkaline Complex.

D. Roach (M.Sc., University of Ottawa) conducted a petrofabric and geochemical study of barite occurrences west of Hemlo, Ontario.

S. Pollock (M.Sc., Carleton University) completed a study of the isotope geochemistry of the Prairie Lake Carbonatite.

T.C. McCuiag (H.B.Sc. candidate, Lakehead University, Thunder Bay, Ontario) is conducting a study of the Port Coldwell veins and veins proximal to the Terrace Bay Batholith.

P.J. Smart (H.B.Sc. candidate, Queen's University, Kingston, Ontario) is conducting a petrographic and structural investigation of the Hemlo Fault.

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7. Northwestern Region Industrial Minerals Program—1987

M.C. Kennedy and E.J. Sherlock

Geologists, Ontario Ministry of Northern Development and Mines, Thunder Bay

INTRODUCTION

GENERAL

A region-wide Industrial Minerals Program was established for the Northwestern Region in 1987, in accordance with a province-wide strategy of stimulating development of Ontario's industrial mineral resources and related manufacturing industries. The Northwestern Region includes the Resident Geologists' Areas of Kenora, Red Lake, Sioux Lookout, Thunder Bay, Beardmore-Geraldton, and Schreiber-Hemlo.

The project was jointly funded by the Canada-Ontario Mineral Development Agreement (COMDA) and the Northwestern Region, Mines and Minerals Division. Industrial Minerals staff consists of Myra Kennedy and Elizabeth Sherlock. Assistance was provided by Gail Jackson during August and September of 1987.

The program's goal is to stimulate exploration, development, and production of industrial minerals in Northwestern Ontario. By identifying opportunities for industrial mineral development, examining and evaluating potential industrial mineral deposits, and monitoring activities concerning industrial minerals in the area, an expanded database for industrial minerals can be provided.

Activities include compilation of information on occurrences and deposits; consultation with prospectors, industry representatives, Resident Geologists' staff, and the public; property visits; mapping; preparation and submission of samples for laboratory analysis; conducting field trips; and presenting poster displays and talks.

ACKNOWLEDGMENTS

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INDUSTRIAL MINERALS IN NORTHWESTERN ONTARIO

By definition, industrial minerals include a large, diverse group of materials encompassing the non-metallic minerals and structural materials. Industrial minerals form the basis for many aspects of the construction, chemical, and manufacturing industries. They are generally selected for a particular application based on their chemical or physical properties. The Industrial Minerals Program deals with many of these commodities. Sand and gravel are excluded from the program's mandate.

Industrial minerals presently produced in Northwestern Ontario include pink granite dimension stone, amethyst, diabase, white quartz, flagstone (schist), and ornamental marble.

Currently, the greatest amount of exploration activity in the area has been directed toward granite dimension stone. Property visits were made to most of the current granite exploration sites. Some detailed mapping was carried out in these areas, as well as a reconnaissance scale investigation of the stone potential in other areas. Cut and polished samples of the stone from each of the sites visited have been prepared and are available for viewing in the Mines and Minerals Branch, Thunder Bay geology office. Occurrences of rare earth elements, feldspar, lithium, barite, silica, graphite, soapstone, and marl are also the targets of exploration and prospecting activity. Geologically, the potential for a wide variety of other industrial mineral deposits also exists.

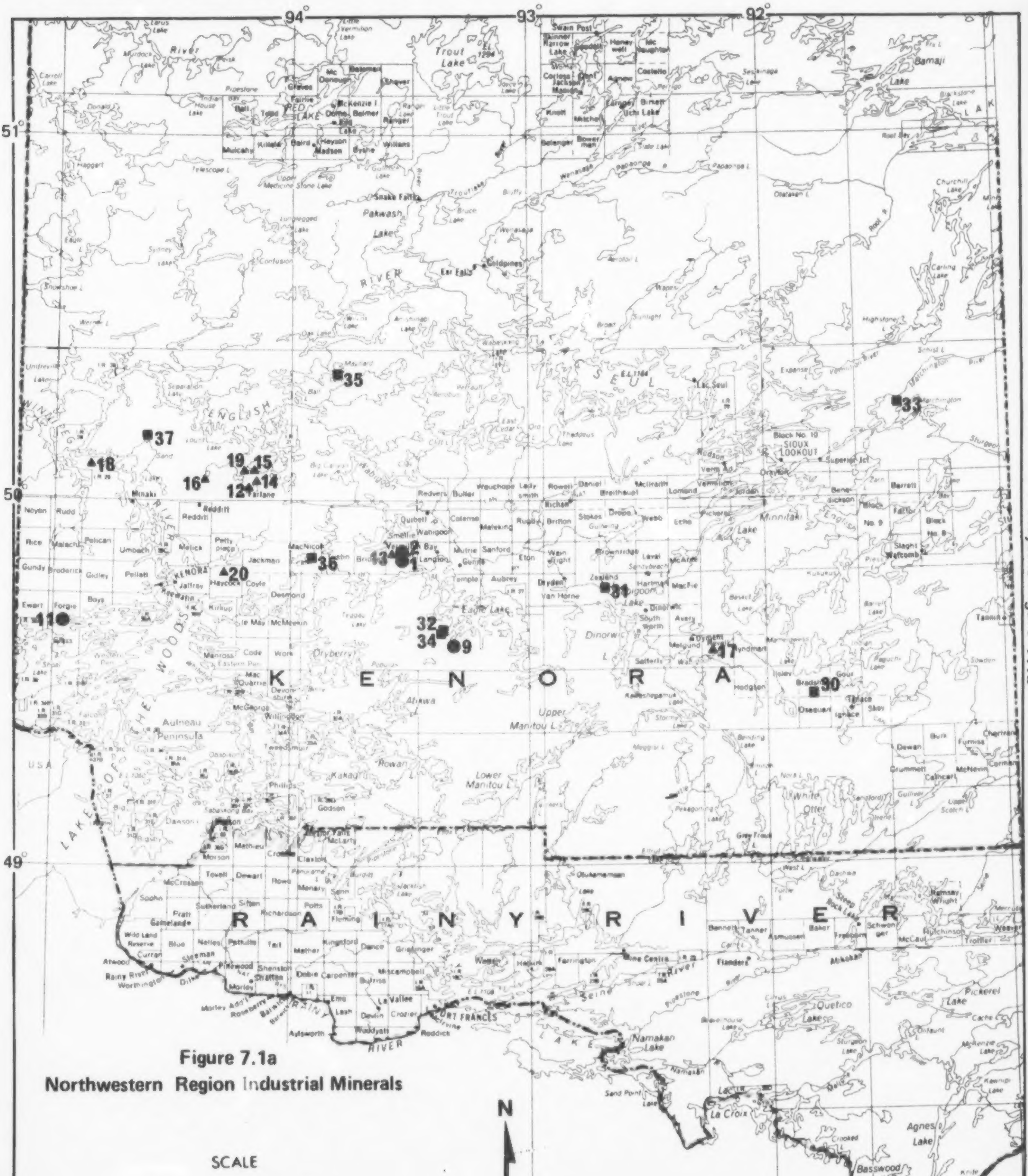
The evaluation of industrial mineral deposits includes determination of the grade and size of the deposit, the necessary or desirable beneficiation or processing, thorough market evaluation, and examination of other considerations such as transportation costs.

OPPORTUNITIES IN INDUSTRIAL MINERALS

Industrial minerals are becoming of greater interest to resource companies wishing to diversify in order to lessen the impact of fluctuations in metal prices and downturns in the fuel industry. Very few pursue industrial minerals at the grass roots level, but they seek to acquire successful industrial minerals operations (e.g., Falconbridge Limited and Indusmin Incorporated, Lacana Mining Corporation and Suzorite Mica Products Incorporated.)

Opportunities for industrial mineral development exist by identifying market trends and needs; filling niches in the industry; and examining the benefits of adding value to products by beneficiation or the production of specialty products. Strong upward market trends in the granite dimension stone industry present opportunities for quarry development in Northwestern Ontario. King (1987) suggests expansion of rare earth markets at a steady rate, which may lead to further exploration in the region. Eckert and Gaunt (1987) suggest three potential industrial mineral uses that offer market opportunities. They forecast modest growth in structural minerals, especially aggregates and crushed stone, and materials for the production of light-weight construction products, such as perlite and fly ash. The second market growth area is in fillers for plastics, or more correctly, in additives for plastics which improve their performance at elevated temperatures. Some examples are mica, talc, and wollastonite. Thirdly, they suggest opportunities in electronic minerals, specifically, high purity, thermally stable silicas.

Value can be added to industrial mineral products through beneficiation and the creation of specialty products. Examples are the production of high purity calcite, barite, and silica, and the production of finished granite products. The development of industrial mineral deposits may also lead to industrial development in the area such as the proposed granite fabrication plant in Vermilion Bay (Nelson Granite). This, in turn, will result in expansion of current oper-


94°
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Adjoins Figure 7.1b
K E N O R A
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ENGLISH RIVER
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Trout Lake
Ear Falls
Sioux Lookout
Kenora
Dryden
Wabigoon Lake
Eagle Lake
Dinorwic
Ignace
Upper Manitou L.
Lower Manitou L.
Minnitaki Lake
Fort Frances
Rainy River
Namakan Lake
Basswood Lake
Quetico Lake
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Figure 7.1a
Northwestern Region Industrial Minerals

Explanation

PRODUCERS/SEASONAL PRODUCERS

	COMPANY	COMMODITY
1	Nelson Granite	pink granite
2	Granite Quarriers (GQI) Inc.	pink granite
3	LTL Contracting Ltd.	diabase
4	Diamond Willow Mine	amethyst
5	Dorion Amethyst Mine	amethyst
6	Ontario Gem Company Mine	amethyst
7	Pearl Lake Amethyst Mines Inc.	amethyst
8	Thunder Bay Amethyst Mine Panorama	amethyst
9	Crystal Quarries Ltd.	white quartz
10	Lunmac Rock	marble
11	Don Barnard Enterprises	flagstone

EXPLORATION PROJECTS

	COMPANY/OWNER	COMMODITY
12	Canital Granite Ltd.	brown granite
13	Nelson Granite	pink granite
14	Nelson Granite	brown granite
15	Nelson Granite	red granite
16	Nelson Granite	beige granite
17	Nelson Granite	white granite
18	Mystery Mountain Minerals Ltd.	pink granite
19	Mystery Mountain Minerals Ltd.	red granite
20	Mystery Mountain Minerals Ltd.	grey granite
21	Dave Petrunka	red granite
22	Dave Petrunka	black, brown granite
23	Unocal Canada Ltd.	rare earth elements
24	Paul Skalesky & Terry Peterson	feldspar
25	Millrock Resources Inc.	barite
26	Walter Seeber	silica
27	Armeno Resources Inc.	lithium

PROSPECTS

	COMPANY/OWNER	COMMODITY
28	Pat Culhane	black granite
29	Tri-Ven Minerals Corporation	marl
30	Eileen and Jim Hepp	grey granite
31	Wabigoon Resources	soapstone
32	Lunmac Rock	soapstone
33	Lunmac Rock	granite
34	Frank Thorgrimson	soapstone
35	George Zebruck & Robert Kuehnbahm	granite
36	George Zebruck	flagstone
37	George Zebruck	red granite

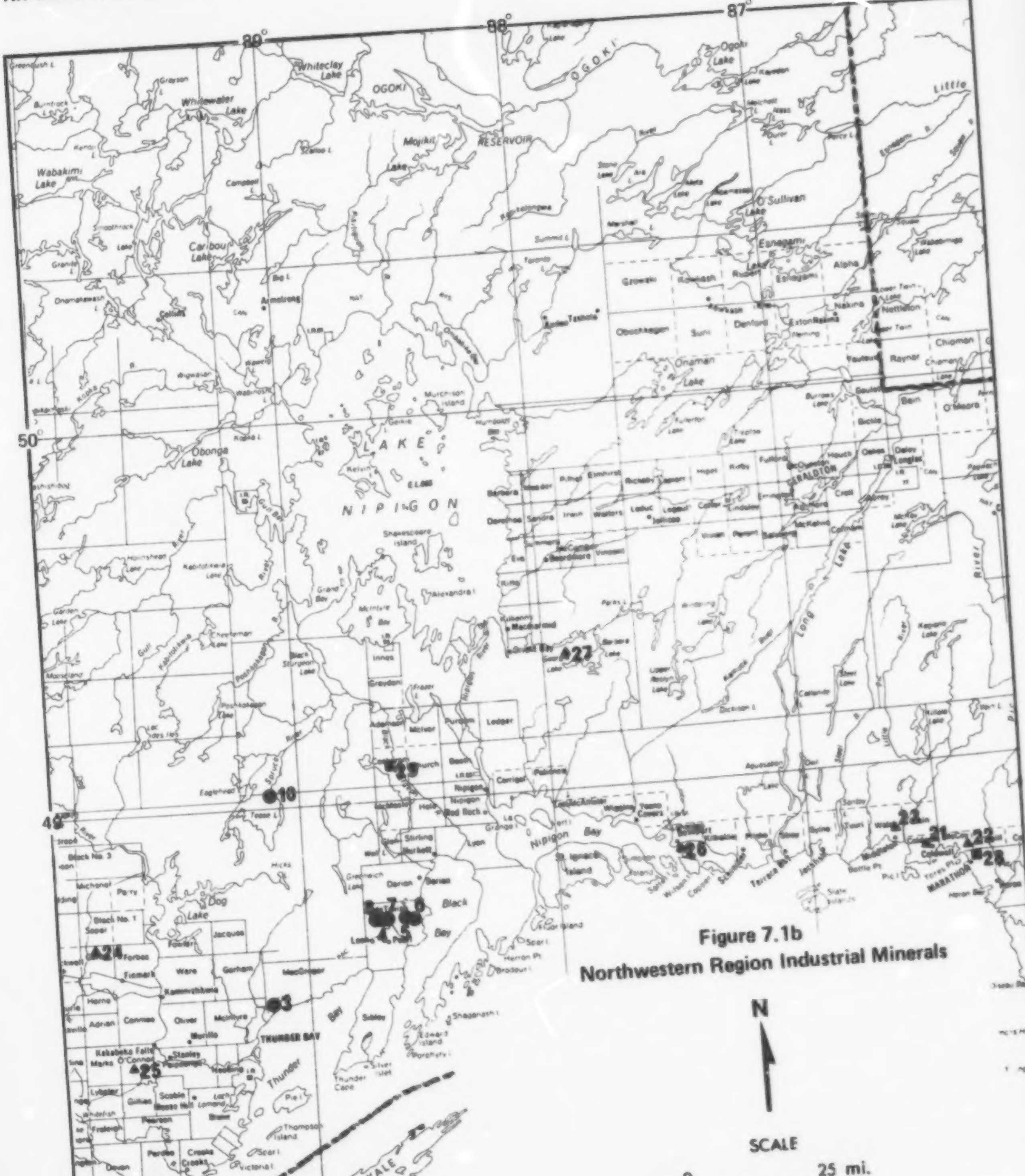

Figure 7.1b
Northwestern Region Industrial Minerals

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LAKE NIPIGON
Nipigon Bay
Black Bay
Thunder Bay
THUNDER BAY
ISLE ROYALE
GERALDTON
MARATHON
Long Lake
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49°
48°
89°
88°
87°

ations and present opportunities for further quarry development.

Although Northwestern Ontario is faced with the disadvantage of long distance from the major manufacturing market of Southern Ontario, access to markets in Central Canada and the United States is excellent. Opportunities to take advantage of low cost shipping by water, through the port of Thunder Bay and Thunder Bay Terminal's bulk handling facility, should not be overlooked.

NORTHWESTERN REGION INDUSTRIAL MINERALS ACTIVITIES

MINING ACTIVITY

Industrial mineral production in the Northwestern Region is summarized in Table 7.1.

Granite Dimension Stone

Two granite dimension stone quarries, Granite Quarriers (G.Q.I.) Incorporated and Nelson Granite, operated in the region in 1987. They are situated in Docker Township, 12 km west of Vermilion Bay, on opposite sides of the Trans-Canada Highway. The quarries are located in a late granitic plug which is part of the Dryberry Batholith. The stone is extracted from nearly unfractured parts of this intrusion. It is a homogeneous, medium-grained, pink granite from which blocks of any size can be quarried.

GRANITE QUARRIERS (G.Q.I.) INCORPORATED Granite Quarriers (G.Q.I.) Incorporated of Beebe, Quebec operates the quarry on the north side of Highway 17 (*see* Figure 7.2). Quarrying was carried out from April to November of this year with approximately 900 m^3 (30 000 cubic feet) of granite extracted. All production is shipped in the form of rough blocks to Eastern Canada and the United States for processing. Approximately three quarters of the stone produced from this quarry is used for monument production with the remainder sold for architectural applications.

NELSON GRANITE Nelson Granite, a division of Nelson Monuments Limited, of Sussex, New Brunswick, operates their quarry on the south side of Highway 17 year round. Production in 1987, was the highest to date, a record 3000 m^3 (100 000 cubic feet of stone. Most of Nelson Granite's production is shipped as rough blocks to Eastern Canada, and various destinations in the United States, for fabrication. The stone is used equally for monumental and architectural applications.

Some of the stone produced at this quarry is processed at the finishing plant on the site. The plant includes two wire saws, a small diamond saw, a semi-automatic polishing machine, manual polishing machines, and a hydraulic splitter. Approximately 350 m^3 (12 000 cubic feet) of stone was sawn in the plant in 1987. Some sawn slabs are shipped from the quarry. Products manufactured at the plant include monuments and monument bases, pavers, some specialty landscaping items, curbing, tables, and counter tops.

Nelson Granite is currently investigating the feasibility of building a large scale fabrication plant at Vermilion Bay to produce granite veneer for architectural applications. This has prompted the company to examine further granite deposits in Northwestern Ontario (see description of exploration activity) and to evaluate reserves of the Vermilion Bay pink granite.

The company has undertaken exploratory work on claims acquired in the vicinity of the presently operating quarries. A new quarry site is currently being opened west of the G.Q.I. quarry on the south side of Aaron Lake (*see* Figure 7.2). Stripping and cleaning of large areas of outcrop on the northern and eastern sides of Aaron Lake have established further extensive reserves of the stone. The work areas are also shown in Figure 7.2. The Vermilion Bay granite is a deposit of massive proportions, sufficient to support quarry activities on any scale for many years.

Amethyst

Amethyst has continued to support a small, but important, industry in the Thunder Bay area in 1987, involving five producing mines, several retail outlets specializing in amethyst products, and a small local craft industry. The producing mines are located in MacTavish Township, northeast of Thunder Bay, and include: Thunder Bay Amethyst Mine Panorama, Diamond Willow Mine, Ontario Gem Company Mine, Pearl Lake Amethyst Mine, and Dorion Amethyst Mine. Thunder Bay Amethyst Mine Panorama is the largest of these, producing in the order of 4000 tons in 1987. Minor production from a number of other properties in the area has also taken place and there is fairly constant exploration activity on known and new amethyst occurrences.

The geology of a number of the amethyst properties in the area has been described in Vos (1976), Patterson *et al.* (1985), and Patterson (in preparation).

Several of the mines operate an on-site "pick-your-own" business which is popular with tourists during the summer months. The principle commercial amethyst products of the mines are specimens; slabbing and tumbling material which is made into bookends; costume jewellery and other giftware products; fireplace and architectural stone; and faceted gems. Other products include landscaping boulders; granite and other fireplace stone; and other mineral specimens, such as barite.

Diabase

Diabase is currently produced from a quarry in MacGregor Township on the east side of the city of Thunder Bay by L.T.L. Contracting Limited. Historically, diabase has been produced from a number of sites in the Thunder Bay area (see Kennedy and Gertzbein *in* Patterson *et al.* 1985) and used primarily for construction purposes, such as in the large breakwater at the port of Thunder Bay. While this is still the case, the material is finding new uses with the majority of L.T.L.'s production being used in erosion control projects.

Recently, the diabase has been used, in the form of rough pieces, as decorative facing stone on the

TABLE 7.1. INDUSTRIAL MINERAL PRODUCERS AND SEASONAL PRODUCERS

Producer	Location	Commodity	Products/Production
Crystal Quarries Ltd.	south of Eagle Lake	white quartz	-landscaping stone -landscaping boulders -exposed aggregate -aquariumstone -500 tons
Diamond Willow Mine	MacTavish Township	amethyst	-various products
Don Barnard Enterprises	Forgie Township	schist	-flagstone -1987 production, 2-3 000 sq. ft. (190-280 sq. m.)
Dorion Amethyst Mine	MacTavish Township	amethyst	-various products
Granite Quarriers (G.Q.I.) Inc.	Docker Township	pink granite	-rough blocks -1987 production 30 000 cu. feet (900 cu. m., 2 500 tons)
L.T.L. Contracting Ltd.	MacGregor Township	diabase	-construction material (rip-rap, etc,) -ornamental stone (building/landscaping) -rock wool raw material
LunMac Rock	Eaglehead Lake	marble	-carving, ornamental objects -very little production in 1987
Nelson Granite	Docker Township	pink granite	-rough blocks -slabs -monuments -pavers -landscaping items, (blocks, benches, etc.) -curbing -tables, countertops -1987 production 100 000 cu. ft. (3 000 cu. m., 8 500 tons)
Ontario Gem Co.	MacTavish Township	amethyst	-various products
Pearl Lake Amethyst Mine	MacTavish Township	amethyst	-"pick-your-own" amethyst -slabbing/tumbling stone (giftware) -specimens -gem quality amethyst -amethyst architectural and fireplace stone -barite crystals -granite fireplace stone
Thunder Bay Amethyst Mine Panorama	MacTavish Township	amethyst	-slabbing/tumbling stone -specimens -amethyst fireplace and architectural stone -faceted gems -"pick-your-own" amethyst -landscaping boulders -granite flagstone -granite fireplace stone -1987 production -4 000 tons

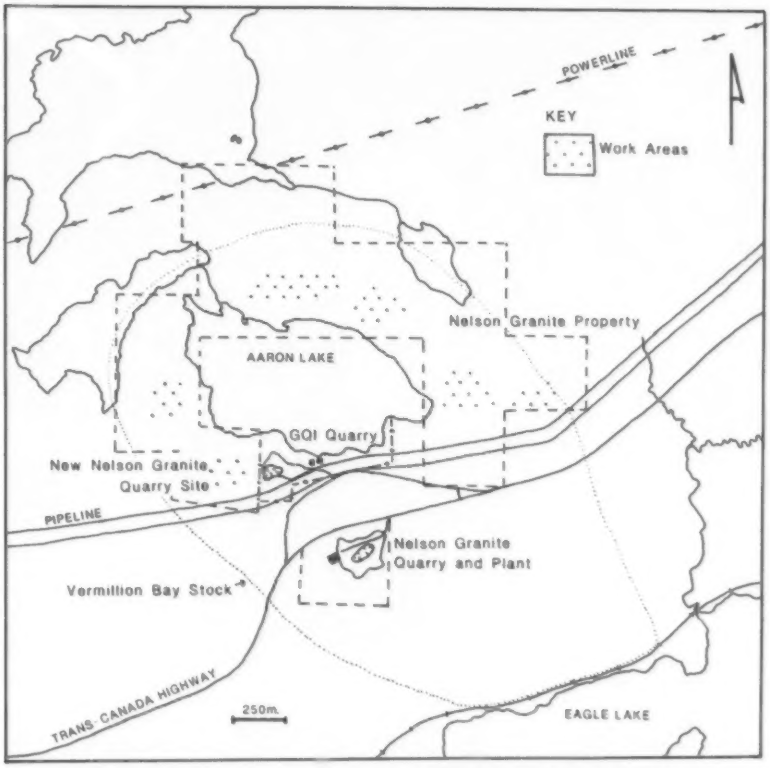


Figure 7.2. Vermilion Bay Granite Deposit; Docker Township.

exterior of several exclusive homes and in fireplace construction. The dark grey stone has proven to be very attractive in combination with popular light coloured woods and when it is used as coordinating landscaping material.

L.T.L. Contracting Limited, in conjunction with Partek Insulation of Sarnia, Ontario, is currently investigating the feasibility of using this diabase as a raw material in Partek's rock wool insulation process. A 1000-ton bulk sample has been crushed and shipped to Sarnia for testing purposes. Partek manufactures specialty rock wool products for high temperature applications such as pipe wrappings.

Other Stone Products

White Quartz Crystal Quarries Limited produces white quartz from a property located south of Eagle Lake near Dryden. The material is produced for ornamental landscaping stone, including crushed stone of various sizes, and sold in bags of 25 to 100 pounds, as well as larger accent pieces. Five sizes of crushed quartz, produced as a by-product of the operation, are sold for use as exposed aggregate in precast concrete panels and as aquarium stone.

The pure white quartz is extracted from a vein 35 m wide with an exposed length of 35 to 40 m (E. Hansen, owner, Crystal Quarries Limited, personal communication, 1987). The quartz is crushed, screened, and washed at the quarry. Production, in 1987, was about 500 tons which was shipped in bulk to Winnipeg, Manitoba, and to Minnesota. Packaging operations (i.e., bagging) are scheduled to begin in 1988 (E. Hansen, owner, Crystal Quarries Limited, personal communication, 1987).

Flagstone Don Barnard Enterprises acquired the former Rush Bay Quarries Limited quarry in 1987. The quarry is located in Forgie Township, west of Kenora. The stone is a rusty, yellow-green schist which splits readily into thin sheets. The deposit is described by Storey (1986). Production, in 1987, was 190 to 280 m^2 (2000 to 3000 square feet) of flagstone. Further development of the quarry site is planned.

Marble A small amount of "marble" was extracted in 1987, by LunMac Rock from a property near Eaglehead Lake, north of Thunder Bay. The blue-gray, white, and multi-coloured dolostone is used for the production of ornamental objects (clocks) and has been used for decorative flooring, carvings, and wall facing.

EXPLORATION ACTIVITY

Granite Dimension Stone

Significant exploration activity for granite dimension stone has taken place recently in Northwestern Ontario. The most notable activity is in the Lount Lake Batholith, north of Kenora (see Figure 7.3). There has also been granite dimension stone exploration in the Marathon and Dryden–Ignace areas. The following is a summary of exploration in the various intrusions. Description of the deposits, or potential deposits, is based primarily on property examinations carried out in 1987.

Lount Lake Batholith Several commercial granite deposits are being investigated in this large intrusion. The Lount Lake Batholith covers an area of 2058 km^2 and is approximately elliptical in plan. It is a syntectonic to late tectonic pluton composed predominately of massive porphyritic granodiorite and porphyritic quartz monzonite (Breaks *et al.* 1978). In general, the stone consists of potassic feldspar (microcline) phenocrysts in a matrix of plagioclase, potassic feldspar, quartz, and biotite. The colour of the stone seems to be determined by the colour and abundance of feldspar phenocrysts, as well as the mafic mineral content of the matrix.

Current exploratory work is directed at several relatively small areas of unfractured and homogeneous stone of various colours. The authors suggest that the Lount Lake Batholith presents a substantial and nearly unexplored target for granite dimension stone.

Nelson Granite has commenced work on a deposit of porphyritic brown granite near Red Deer Lake. An area has been cleared and some outcrop stripped. At the time of writing, part of a bulk sample had been extracted and removed from the site for testing purposes. Canital Granite Limited, which operates a granite tile plant in Winnipeg, Manitoba, has also acquired ground in the vicinity of Red Deer Lake and will begin work on the site in the Spring of 1988.

The Red Deer Lake area was examined in some detail by the authors and areas suitable for quarrying were outlined (*see* Figure 7.4). The granite formation is very massive with few, widely spaced, vertical fractures. Sheeting, or horizontal fracturing, is spaced from 1 to 5 m and greater, allowing for the extraction of very large blocks. The stone may vary in colour at different sites. The polished stone is very attractive and suitable for use as both monumental and architectural stone. It closely resembles a fairly high priced granite produced in Minnesota and South Dakota known as Carnelian, or Dakota Mahogany.

During investigation of the brown granite deposit, an area of pink porphyritic granite which appears to be highly suitable for quarrying was located to the west of Red Deer Lake. It is indicated on Figure 7.4.

West of Wonderland Lake, Mystery Mountain Minerals Limited of Gatineau, Quebec, is investigating a deposit of porphyritic red granite. In 1986, nine diamond-drill holes, totalling 91 m (297 feet) were completed on the property. Work in 1987, consisted of petrographic analysis and physical testing performed on core samples (P. Gagne, Mystery Mountain Minerals Limited, personal communication, 1987). Nelson Granite began work on this same deposit in 1987. A small amount of stripping was carried out and bulk samples have been extracted at three sites on the property. In the same area, Nelson Granite has identified a deposit of grey to beige porphyritic granite.

Near Forgotten Lake, Nelson Granite has delineated a large deposit of porphyritic, beige or yellow granite which is exceptionally unfractured. A bulk sample has been extracted from this site for testing purposes. A pink or salmon coloured phase of this granite has also been identified.

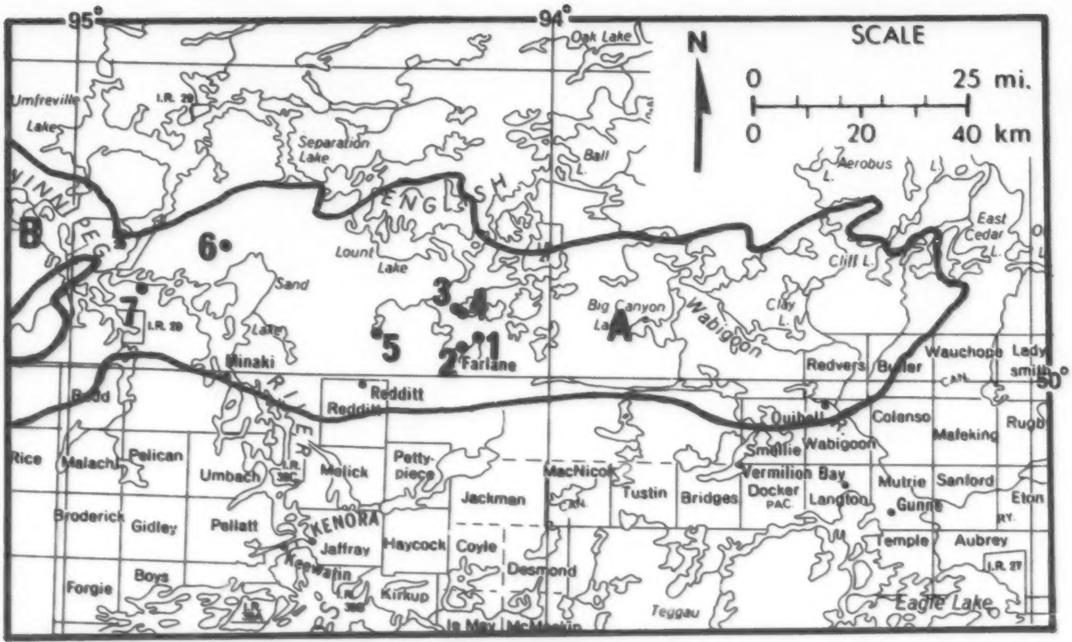
North of Sand Lake, near Snook Lake, George Zebruck of Kenora has staked a potential deposit of porphyritic, red to brown granite. No work has been done on the property but it appears to be a favourable site for further evaluation as the granite is quite homogeneous and fractures are widely spaced.

Tetu Lake Batholith Mystery Mountain Minerals Limited conducted a diamond drilling program in 1986 on a property in this batholith located south of Whitedog Falls on the Winnipeg River. The program consisted of 14 holes with a total length of 152 m (493 feet). During 1987, they continued petrographic analysis and physical properties testing on samples obtained in the drill program. The stone is a dark pink, medium-grained quartz monzonite (Breaks *et al.* 1978). On the surface, the stone is quite massive, although fracturing is not uncommon. The texture is fairly homogeneous with some pegmatitic veins and patches.

Haycock Township Mystery Mountain Minerals Limited also carried out exploratory work on a potential black granite deposit located in Haycock Township. They drilled five holes totalling 77 m (250 feet) in 1986, and performed testing work on the core in 1987. The stone is a gray to black, equigranular, medium-grained diorite-gabbro which is very attractive when polished. The texture and colour appear to be somewhat variable and the core logs record numerous veins in the drill core (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Kenora).

Revell Batholith Nelson Granite is investigating a potential white granite deposit located in Revell Township between Dryden and Ignace. The stone is a medium-grained, white to gray granite, very suitable for use as monumental and architectural stone. A test block of the stone was removed from the site. Physical properties, sawing and polishing tests were carried out on the sample material with favourable results (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Kenora). A test monument was also produced. The Revell Batholith was identified as a potential source of granite dimension stone by Storey (1986).

Cecil Lake Pluton Five patented claims encompassing a portion of this pluton are being re-examined for their granite dimension stone potential. The property, located approximately 12 km west of Ignace near Butler Station on the Canadian Pacific Railway, is owned by Cecil Horne of Ignace. Granite was extracted from a number of sites on the property between 1914 and 1953 by the William Horne Granite Company. Production was primarily for monuments, paving stone, and building stone. The property is being re-evaluated by relatives of the owner, Eileen and Jim Hepp of Duluth, Minnesota.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Separation Lake
Oak Lake
Ball L.
Aerobus L.
ENGLISH
Lount Lake
Sand Lake
Big Canyon Lake
Wabigoon
Clay L.
Cliff L.
East Cedar L.
Minaki
Farlane
Redditt
Redvers
Butler
Wauchope
Ladysmith
Quibell
Colenso
Mafeking
Rugby
Rice
Malachi
Pelican
Umbach
Melick
Petty-piece
MacNicol
Tustin
Bridges
Smellie
Wabigoon
Vermilion Bay
Docker
Langton
Mutrie
Gunne
Sanford
Eton
Broderick
Gidley
Pellatt
KENORA
Jaffray
Haycock
Jackman
Coyle
Desmond
Temple
Aubrey
Forgie
Boys
Keewatin
Kirkup
Teggau
Eagle Lake
McMeekin

Figure 7.3

Figure 7.3

GRANITE DIMENSION STONE EXPLORATION ACTIVITIES

A - Lount Lake Batholith
B - Tetu Lake Batholith

1) Nelson Granite, Red Deer Lake
porphyritic brown granite

2) Canital Granite, Red Deer Lake
porphyritic brown granite

3) Mystery Moutain Minerals Ltd., Wonderland Lake
porphyritic red granite

4) Nelson Granite, Wonderland Lake
porphyritic red granite

5) Nelson Granite, Forgotten Lake
porphyritic yellow/beige granite

6) George Zebruk, Snook Lake
porphyritic red granite

7) Mystery Mountain Minerals Ltd., Whitedog
pink granite

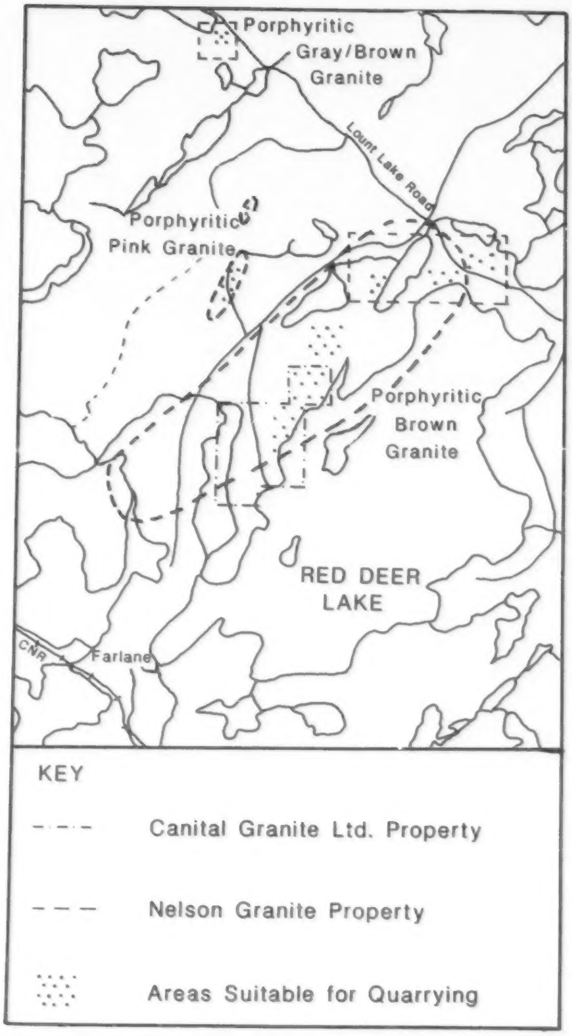

Figure 7.4. Dimension Stone Potential of the Red Deer Lake Area.

At present, the only good exposure of the granite is at the former quarrying sites. The stone is a fine-grained gray granite. It is fairly homogeneous, although in some parts of the property the granite was somewhat streaky and in places rusty weathering spots were observed. In general, the granite appears to be very massive. Sheeting tends to be in the order of 0.5 to 1 m in thickness and in some areas is 2 to 4 m thick. The property has been described by Storey (1986). The owners plan a clearing and stripping program in order to expose more of the granite for evaluation purposes.

Coldwell Alkaline Complex David Petrunka, of Thunder Bay, holds claims covering potential black, brown, and red granite deposits near Marathon. The various colours of stone are different syenitic phases of the Coldwell Alkalic Complex. The stone, and the history of quarrying in the Marathon area, are described by Kennedy and Gertzbein *in* Patterson *et al.* (1985 and 1986). Petrunka carried out stripping on the properties and removed test blocks of the brown granite in 1986.

Pat Culhane, of Thunder Bay, also holds claims covering black granite near Marathon. Diamond drilling of one potential quarry site was carried out in 1986, while the claims were under option.

Feldspar

Investigation of a potentially economical feldspar pegmatite dike in Goldie Township, called the Buda Feldspar Deposit, continued in 1987. Feldspars are the most common igneous material and occur in a variety of forms and mixtures. Feldspars of commercial value occur in pegmatites as large crystals, free of iron-bearing impurities.

In 1939, L. Bland and L. Blank staked two claims that covered part of this pegmatite occurrence in Goldie Township. In that same year, Bland and Blank blasted a pit 1.2 m by 1.2 m by 1.2 m in the occurrence (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). In 1979, P. Skalesky, W. Peterson, and T. Peterson staked the original showing, now referred to as the eastern dike, and an area to the west. This area contains another occurrence of pegmatite and is referred to as the western dike. In the following year, the property was optioned by Steep Rock Iron Mines Limited. This company performed geological mapping and testing work, after which the property was returned. Analysis of a sample submitted in 1983, indicated potentially favourable potassium content in the order of 12 percent K_2O, and identified the feldspar as microcline. Further work on the western dike involved a trenching program in 1985.

In 1987, Skalesky, Peterson, and Peterson submitted an application to lease the eastern and western dike properties. The ground has been optioned to Peddle Lake Mining Corporation of St. Paul, Minnesota. Additional ground has been staked, covering another new showing of a pegmatite dike in the immediate area.

With this new discovery, the Buda Feldspar Deposit encompasses three pegmatite dikes composed of feldspar, quartz, and muscovite. Accessory minerals include tourmaline, garnet, and apatite. The western dike is the largest of the three and is approximately 450 m in length and varies from 40 to 120 m in width. The eastern dike is 300 m long and up to 21 m wide (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). A detailed description of the eastern dike is given by Scott (1981). The third pegmatite feldspar dike of the Buda Deposit is approximately 800 m south-southwest of the western dike. Since this dike is a recent discovery, there is minimal information available. The new dike looks similar to the other main dikes of the deposit and adds to the already existing potential of the Buda Feldspar Deposit.

TABLE 7.2. LITHIUM PROPERTIES IN THE GEORGIA LAKE AREA

Owner	Property	Estimated Reserves (Tons)	Average Li Content (%)	Reference
Armeno Resources Inc.	*Jean Lake Deposit	1 689 000	1.3	Pye, 1965
	*Newkirk-Vegan Deposit	750 000	1.38	Pye, 1965
	*NMW Lithium Deposit	n/a	n/a	
	*Noranda-McVittie Lithium Deposit	261 000	1.03	Pye, 1965
	*Lew Lithium Deposit	n/a	n/a	
	*Foster Lithium Deposit	n/a	<1%	Pye, 1965
W. W. Brinklow	*claims ~5 km east of Cosgrove L. (Della L. Area)	n/a	n/a	new claims in 1987
Carey Lance	*claims on east shore of South Bay of Barbara L.	n/a	n/a	new claims in 1987
Evergreen Energy Resources Ltd. and Ontario Lithium Company Limited	Ont. Lithium Company Ltd. (leased)	2 000 000	1.09	Pye, 1965
York Consolidated Exploration Ltd.	Nama Creek Mines Ltd. (leased)	4 292 332	1.06	Pye, 1965
Owned by Crown (not open for staking)	Aumacho River Mines Ltd.	759 475	1.65	Pye, 1965

Notes:
n/a - not abailable
* - exploration activity in 1987

Lithium

The spodumene pegmatites in the Georgia Lake area were discovered and extensively explored in the mid-1950s. Minimal development was undertaken because of the lack of an adequate market (Pye 1965) and the area was relatively inactive until recently. Anticipated technological improvements in the metallurgical and chemical industries are expected to increase the lithium-metal markets. This factor has led to an increased interest in the Georgia Lake pegmatites.

The common minerals of the pegmatite dikes are microcline, perthite, albite, quartz, spodumene, and muscovite. Accessory minerals are apatite, beryl, bityite, clevelandite, columbite, garnet, hühnerkobelite, molybdenite, petalite, purpurite, sericite, talc, tourmaline, and minor lepidolite and amblygonite (Hewitt 1967; Milne 1962). It is this mineralogy, and the abundance of minerals and deposits, that gives the Georgia Lake pegmatites the potential to provide lithium-metal, ceramic-grade spodumene, and rare earth elements to increased markets.

Table 7.2 lists the owners of properties in the Georgia Lake area, and the known estimated reserves and lithium content of each deposit. The deposits with asterisks had work done on them in 1987.

Armeno Resources Incorporated have been active in the area since 1983. Work in 1984, involved line cutting, geological mapping, VLF-electromagnetic and magnetic surveys on the Newkirk-Vegan and Noranda-McVittie properties. Drilling in the 1950s outlined 750 000 tons of material from the Newkirk-Vegan property at an average grade of 1.38 percent Li_2O and 261 000 tons of material from the Noranda-McVittie property at an average of 1.03 percent Li_2O (Pye 1965). During 1986, Armeno Resources carried out a geochemical soil sampling program on the properties, searching for other lithium bearing structures. The search continued in 1987, when VLF-electromagnetic and magnetic surveys were carried out on the Newkirk-Vegan property. In 1987, the Noranda-McVittie Property was surveyed and two holes were diamond drilled on the southern section of the deposit (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). This section was estimated to contain 770 tons of material per vertical foot at an average grade of 1.0 percent Li_2O (Pye 1965). Both drill holes intersected three spodumene pegmatite veins. At this time, no sample analysis has been reported.

During 1986 and 1987, Armeno acquired ground containing the Jean Lake Deposit. The five principal pegmatite veins that make up this deposit were worked on in the 1950s by Jean Lake Lithium Mines Limited. Their diamond drilling program determined that the No. 4 or Parole Lake vein, contained approximately 1 689 000 tons of material having an average grade of 1.3 percent Li_2O to a depth of 338 m (1100 feet) (Pye 1965). Work on the property, in 1987, involved stripping and trenching.

In 1987, Armeno Resources also acquired three other deposits in the area. They are the M.N.W. Lithium Deposit, the Lew Lithium Deposit, and the Foster Lithium Deposit. The M.N.W. Deposit was worked on in 1956, by the Consolidated Mining and Smelting Company of Canada Limited (Pye 1965). Nothing of economic value was found by the drilling program so the property was returned to its vendors and the claims were cancelled. The M.N.W. Deposit was tested for its beryl content in the late 1950s, and for its cesium content in 1960. In the mid-1970s, J.A. Donner of the Bird River Mining Company Limited investigated the M.N.W. for its potential for ceramic-grade spodumene (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). The M.N.W. pegmatite is considered unique in the area because of its well developed internal zoning (Pye 1965). It has been studied in detail by Milne (1962) because of the presence of petalite and columbite. Breaks (1980) noted the presence of the rare element minerals columbite, cassiterite, and alkali beryl. The M.N.W. was staked in 1986, by B. Zaychkivsky, and geological work was carried out.

The Lew Lithium Deposit and the Foster Lithium Deposit were discovered in 1956, by the Towagmac Exploration Company Limited (Pye 1965). Except for stripping, very little work was done on the Lew Lithium Deposit at that time. The Foster Lithium Deposit occurs near the northeastern end of Lake Jean. Work, in the 1950s, indicated only low-grade lithium ore, so the claims were allowed to lapse (Pye 1965).

In 1987, W.W. Brinklow staked an area approximately 5 km east of Cosgrove Lake. The pegmatites near Cosgrove Lake are similar to the M.N.W. Deposit. Another block of claims was staked by Carey Lance on the eastern shore of Southern Bay of Barbara Lake. This block of claims is located near the Ontario Lithium Company Limited Deposit, a leased property owned by the Ontario Lithium Company Limited and Evergreen Energy Resources Limited. The Ontario Lithium Company Deposit was discovered in 1955, and tested by diamond drilling. Of the five pegmatite veins that make up the deposit, the Jackpot Vein was found to contain 2 000 000 tons of material at an average grade of 1.09 percent Li_2O (Pye 1965).

Rare Earths

The rare earth elements comprise the lanthanide elements (Atomic Numbers 57-71) plus yttrium. Scandium, which is chemically similar to the rare earths, is often grouped with them. The rare earth elements are generally classified as "light" (LREEs) or "heavy" (HREEs). The groups's names are based on their most abundant member. As a result, the LREEs are called the cerium-group and the HREEs, the yttrium-group (Shannon 1983).

The rare earths have many and diverse uses. They may be used as mixtures (alloys or compounds) or as individual rare earth elements. Rare earth mixtures are used as catalysts for petroleum cracking and in other catalytic applications, in alloys and as metallurgical additives, as glass polishing compounds, and other uses. Some of the uses for individual rare earth metals or compounds are in magnetic materials, phosphors, neutron capture applications, as glass decolourizing and colouring agents, in speciality glasses, in ceramics, and larger applications (King 1987). New and increased markets for specific rare earths have resulted in increased production of all rare earth metals (King 1987). Growth areas for rare earths include permanent magnets (samarium-cobalt and neodynium-iron-boron high strength magnets) (Robbins 1987), ceramics (yttrium and ytterbium stabilized zirconia), phosphors (fluorescent lighting and X-ray intensifying screens), glass additives, and hydrogen fuel cells (lanthanum-nickel alloy can absorb 400 times its own volume of hydrogen) (King 1987).

The principle minerals from which rare earths are commercially derived are the phosphates, monazite and xenotime, and a carbonate, bastnaesite (Harben and Bates 1984). Most rare earths are produced as by-products of mining operations for heavy minerals (titanium and zirconium), tin, phosphate, iron, and uranium (Moore 1980). Molycorp Incorporated produces rare earths from a bastnaesite deposit in California.

The increasing demand for rare earths may present opportunities for exploration and development in Northwestern Ontario. The rare earth elements are commonly associated with alkaline, carbonatite, and peralkaline igneous complexes and their associated metasomatic alteration zones and hydrothermal systems (Allan 1987), as well as in placer, beach sand, and phosphatic sedimentary deposits (King 1987). The former are exploration targets for rare earths in Northwestern Ontario. Unocal Canada Limited is investigating the rare earth potential of a property near the Coldwell Alkaline Complex on the northern shore of Lake Superior. This property is described in Schnieders *et al.*, this volume.

Barite

In 1984, Millrock Resources Incorporated obtained a group of claims that cover a barite showing in O'Connor Township. The showing consists of a vein up to 3 m (10 feet) wide composed of varying proportions of quartz (some amethystine), calcite, barite, and fluorite with minor galena and sphalerite. The vein is hosted in a grainstone unit of the Gunflint Formation. Work on the property began in 1984, with a stripping and trenching program on the northeastern claims. The southern claims of the group were stripped and trenched in 1987. To study the extent of the deposit, a diamond-drilling program was also completed in 1987. Table 7.3 is a brief summary of the drill logs and sample analysis of the three holes.

Flagstone

George Zebruck of Kenora has staked a claim covering a potential black flagstone deposit in MacNicol Township between Kenora and Vermilion Bay. The stone is a black, amphibolitic schist which has a shiny, very attractive appearance. The schistosity is vertical, permitting extraction of thin sheets of the

TABLE 7.3. DRILLING-MILLROCK RESOURCES INC., BARITE PROPERTY

Sample No.	Footage	Rock Type	Relative Abundances of Minerals				Barium Content (ppm)
			Q	C	B	F	
Hole 1							
CL0001	65.5-67.5	Q-C Vein	A	B	D	C	1.10%
CL0002	87.5-89.5	Q-C-B Vein	C	B	A	-	30.10%
CL0003	89.5-94.0	Q-C-B Vein	C	B	A	-	36.70%
Hole 2							
CL0004	69.5-63.0	Q-C-B Vein	C	B	A	D	21.70%
CL0005	63.0-66.0	Q-C-B Vein	A	B	B	-	2.43%
CL0006	66.0-68.0	Q-C-B Vein	C	A	C	B	1732
CL0007	68.0-71.0	Q-C-B Vein	B	A	-	C	487
Hole 3							
CL0008	143.0-144.0	grainstone	A	B	-	-	346
CL0009	189.0-191.5	Q-C Vein	A	B	tr	tr	4860
CL0010	191.5-192.5	Q-C Vein	B	A	tr	-	9560
CL0011	193.5-194.0	Q-C Vein	A	B	-	tr	208
CL0012	220.5-222.75	Q (amethystine)	A	B	-	tr	330
CL0013	223.5-225.5	C-B Vein	A	B	-	tr	120
CL0014	231.0-235.5	C-B Vein	A	B	-	-	216
CL0015	233.5.236.0	C-B Vein	A	B	-	tr	125
CL0016	238.5-242.0	C-B Vein	A	C	-	B	226

Notes:
Q - quartz
C - calcite
B - barite
F - fluorite

A = most abundant
B = second most abundant, etc.
tr = trace = XRD peak just barely detected

rock. Testing will be required to determine how well the stone splits.

Soapstone

The two soapstone properties currently under investigation are the Eagle Lake Soapstone Quarry and the Wabigoon (Pigeon) Deposit.

The Grace Mining Company began development of the Eagle Lake Soapstone Quarry in 1924. In that year a camp was erected and a large sawing plant was installed (Spence 1940). The soapstone is gray to gray-green in colour, fine-grained, and is cut by narrow (<1 cm) carbonate veins (Storey, in press). The soapstone was removed by channelling and then sawn into blocks. These blocks were used for lining the furnaces of kraft paper mills. Approximately 174 tons of material was removed between 1925 and 1927 when operations discontinued (Spence 1940). Quarry permits were issued in 1987 to LunMac Rock and Frank Thorgrimson to remove material from the old quarry site.

The other soapstone prospect is the Wabigoon (Pigeon) Deposit. In 1921, L. Pigeon, of Wabigoon, discovered the deposit and did a considerable amount of stripping to determine the extent of the deposit (Satterly 1941). The deposit is made up of a dark-gray soapstone containing, in some samples, rhombs of a brown carbonate (Storey 1986). In 1922, Pigeon sold a half interest to H.H. Sutherland, of Toronto, and the Wabigoon Soapstone Company Limited was organized. The company did more stripping, trenching, and sampling in 1926 and 1927 (Satterly 1941). Until recently, no work had been done on the property. Wabigoon Resources of Toronto currently holds the property and began a program of stripping and surface sampling in 1983. Three rotary holes were drilled to provide samples for flotation tests.

Graphite

George Zebruck and Robert Kuenbahm are investigating a potential flake graphite deposit near Treelined Lake, 60 km north of Kenora. The property consists of 20 contiguous claims. Two graphite-bearing zones within high grade metasedimentary rocks were discovered in the 1960s during uranium exploration activities. The occurrence is described in some detail by Storey (in press) and by Janes *et al.* (1987). A property visit during the summer of 1987, revealed that the graphite occurs as fine disseminations in siliceous sediments and as coarser flakes concentrated in narrow shear zones. The graphite occurs up to 30 percent by volume but is more commonly five to seven percent. The richest graphite concentrations are in a shear zone approximately 2 m wide and of undetermined strike length.

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8. Wawa Resident Geologist's Area—1987

D.J.J. Tortosa[1], E.D. Frey[2], A. Wilson[3], W. Wing[3], L. Ashick[4], and J. Melisek[5]

[1]Resident Geologist, Ministry of Northern Development and Mines, Wawa

[2]Staff Geologist, Ministry of Northern Development and Mines, Wawa

[3]Contract Geologist, Ministry of Northern Development and Mines, Wawa

[4]Contract Geologist, Ministry of Northern Development and Mines, Sault Ste. Marie

[5]Drill Core Library Geologist, Ministry of Northern Development and Mines, Sault Ste. Marie

INTRODUCTION

The Wawa Resident Geologist's Office was established January 1, 1987, in order to better meet the needs of the mining and exploration community active in the Wawa area. The creation of a Resident Geologist's Office was one of several Economic Development Initiatives which the Ontario Provincial Government has undertaken for Wawa and the surrounding area. The Wawa office provides mining and exploration companies with access to mineral resources information, technical advice to prospectors and explorationists, and is a sales outlet for claim maps, claim tags, prospector licenses, geological maps, and publications.

Permanent office staff consists of Delio Tortosa, Resident Geologist; Ed Frey, Staff Geologist; and Barbara Leschishin, Secretary/office administration. Contract geological staff consists of Lorry Ashick, Ed Haley, Joseph Melisek (until October), Rosa Stewart, Ann Wilson, and Wendy Wing.

Exploration activity continued on an upswing throughout 1987 as Figures 8.1 and 8.2 and Table 8.1 indicate. Claim staking activity is summarized in Figure 08.3. The main areas of exploration activity in the district centred on the Michipicoten and Mishibishu Lake Greenstone Belts, focussing on four main areas: a) the Renabie-Dog Lake area, b) Goudreau-Lochalsh area, c) Wawa-Michipicoten area, and d) the Mishibishu Lake area. Both the Kabinakagami Lake and Dayohessarah Lake Greenstone Belts in the northern part of the district saw an increase in exploration activity. Major exploration programs in the district increased from 15 at the beginning of the year to 40 as of December 1987 (Figure 8.2).

In the Goudreau area, Muscocho Explorations Limited continued underground exploration of the Magino Deposit and Canamax Resources Incorporated announced production on its Kremzar Gold Deposit for September 1988. In February 1987, Canamax Resources Incorporated announced a new gold discovery in the Goudreau area, approximately 2 km south of its Kremzar Gold Deposit. In the Wawa-Michipicoten area, Citadel Gold Mines Incorporated completed an extensive surface and underground exploration program on the former Surluga Mine. In the Mishibishu Lake area, Muscocho Explorations Limited continued an aggressive underground exploration program at the Magnacon Gold Deposit, and Granges Exploration Limited received sufficiently favourable results from their surface exploration program to warrant underground development on a drill-indicated zone 2 km west of the Magnacon Deposit. The Renabie Gold Mine continued to be the only producing gold mine in the Wawa Resident Geologist's district and The Algoma Steel Corporation Limited's George W. MacCleod Mine (iron) was the main single employer in the Wawa area.

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

Client services which were provided by office staff during the first year of operation are indicated on Figure 8.4. The total number of clients served by office staff was 1026 as of December 1, 1987. An increase in the level of office activity was noted starting in September due to the establishment of the Wawa office as a sales outlet for claim maps, prospector licenses, and claim tags. B. Leschishin and W. Wing were cash receiving agents and were responsible for sales. In addition to receptionist and secretarial duties, B. Leschishin provided the Resident Geologist with capable administrative assistance throughout the year; she also oversaw the reorganization of the public access area (including the design of a sales counter) for more efficient use of office space.

The Resident Geologist was primarily involved with setting up the administrative and organizational structure for the new office, as well as the administration and management of four projects initiated at the beginning of 1987 and financed by the Northern Development Fund. In addition, the Resident Geologist visited 32 active properties undergoing exploration or underground development, attended nine field trips, and held three impromptu field tours for interested parties.

Public addresses were made concerning exploration and development activity in the Wawa area at a public forum for the Wawa community, for the Wawa Rotary Club, and at the annual Ontario Geological Survey Geoscience Research Seminar in Toronto. Poster presentations on the "Reconnaissance Geology of the Granitic and Gneissic Terranes in the Wawa District" were made at the annual Northern Geoscience Seminar in Timmins and for the 33rd annual meeting of the Institute on Lake Superior Geology held in Wawa. A poster presentation on "Exploration and Development Activity in the Wawa District" was given at the annual Ontario Geological Survey Geoscience Research Seminar. Much time was also spent responding to government, industry, and public inquiries. The Resident Geologist was also a member of the Wawa-Dubreuilville Economic Development Committee.

Primary office activities of the Staff Geologist consisted of providing information and technical advice on request to prospectors and geologists from the exploration, academic, and government communities, as well as to the general public. The Staff

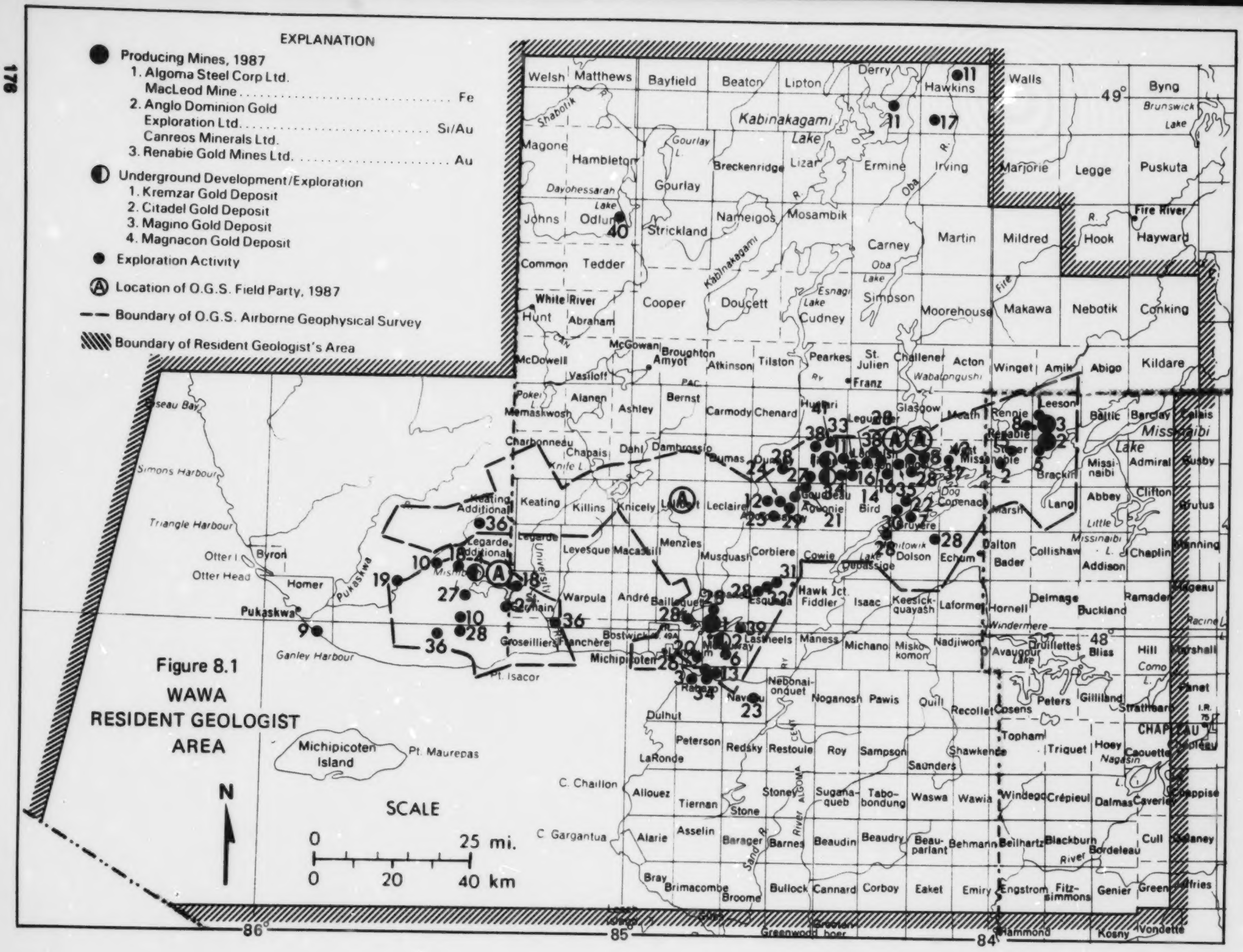
EXPLANATION
● Producing Mines, 1987
1. Algoma Steel Corp Ltd. MacLeod Mine .... Fe
2. Anglo Dominion Gold Exploration Ltd. .... Si/Au
Canreos Minerals Ltd.
3. Renabie Gold Mines Ltd. .... Au
◐ Underground Development/Exploration
1. Kremzar Gold Deposit
2. Citadel Gold Deposit
3. Magino Gold Deposit
4. Magnacon Gold Deposit
• Exploration Activity
Ⓐ Location of O.G.S. Field Party, 1987
— — Boundary of O.G.S. Airborne Geophysical Survey
▨ Boundary of Resident Geologist's Area
N
SCALE
0
25 mi.
0
20
40 km
49°
48°
86°
85°
84°
Kabinakagami Lake
Michipicoten Island
Pt. Maurepas
C. Chaillon
C. Gargantua
Pukaskwa
Ganley Harbour
Pt. Isacor
Otter Head
Triangle Harbour
Simons Harbour
White River
Fire River
Franz
Missinaibi Lake
CHAPLEAU
Michipicoten
Hawk Jct.

Figure 8.1
WAWA
RESIDENT GEOLOGIST
AREA

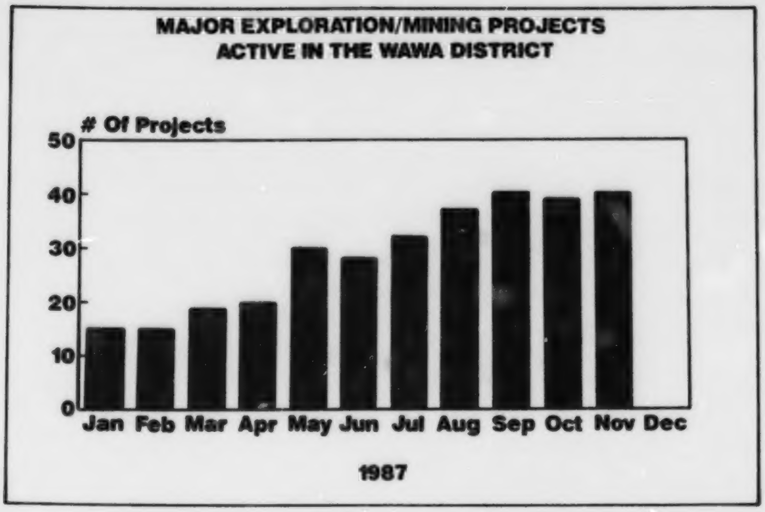

Figure 8.2. Exploration and mining projects active during 1987.

Geologist provided assistance on 360 requests for information, conducted 15 organized and impromptu field trips, and visited 29 exploration/mining projects. Geological education and mineral exploration awareness were promoted by presentations to a Ministry of Natural Resources Junior Ranger camp and the Wawa Rotary Club.

The development of a computerized database for mineral deposits in the Wawa District was initiated, assisted by R.C. Stewart (Contract Geologist, Ministry of Northern Development and Mines, Thunder Bay). A poster on the "Wawa District Mineral Deposits Database" was exhibited at the Ontario Geological Survey Geoscience Research Seminar in Toronto, and another on "Exploration Developments and Prospects, Wawa District" was exhibited at the Northern Geoscience Seminar in Timmins.

In addition to the above activites, the Staff Geologist spent the initial part of the year making preparations for, and organizing, the 33rd annual meeting of the Institute on Lake Superior Geology. In addition to directing the preparation of local facilities and logistics for nine field trips, the Staff Geologist edited abstracts of the 34 papers and 29 posters presented, conducted two field trips to examine the geology of Wawa gold mineralization, and managed registration and financial details, with helpful assistance from B. Leschishin.

A. Wilson began a study to evaluate the mineral resource potential of the granitic and gneissic terranes in the Wawa District. She was assisted by R.C. Stewart during the field season. A poster on "Building Stone Potential in the Wawa District" was exhibited at the annual Ontario Geological Survey Geoscience Research Seminar in Toronto. Assistance was provided to the Resident Geologist's Office in the acquisition of necessary field and office equipment. In addition, two geological field trips were held in Lake Superior Provincial Park for the public, and a lecture on local geology was given at the Michipicoten High School.

W. Wing oversaw the organization of the mineral resources library, was responsible for the processing of assessment files in conjunction with the Assessment Files Research Office (AFRO), and began data compilations and updates for Geological Data Inventory Folios in areas with high exploration activity (Goudreau area). Assistance was provided to the Resident Geologist's Office in the acquisition of essential field and office equipment, on inquiries for mineral resources information, on the establishment of the office as a sales outlet, and in the sale of claim maps, claim tags, and prospector licenses. In addition, W. Wing presented a poster presentation at the Ontario Geological Survey Geoscience Research Seminar on "Geological Data Inventory Folios" with accompanying computer databases. This presentation was part of a co-operative project between the Geoscience Data Centre (Ontario Geological Survey, Toronto) and the Wawa Resident Geologist's Office.

L. Ashick and J. Melisek began the consolidation of the Algoma Central Railway (ACR) and Algoma Ore Division mineral exploration files with the assessment files of the Wawa and Sault Ste. Marie Resident Geologist's Offices. W. Wing was involved in integrating the compiled ACR files into the assessment file system for the Wawa office. Emphasis during 1987 was directed at consolidating the Algoma Central Railway exploration files and updating the respective Geological Data Inventory Folios (GDIFs).

DRILL CORE LIBRARY PROGRAM by J. Melisek

A majority of the core received from the Wawa area in 1987 resulted from the boundary change at the beginning of the year. The Timmins core library supplied many of the new additions due to the change. Overall, there were 56 new drillholes added to the core library for the Wawa District with a total footage of 3763 feet. Many of these holes are from east and north of the former boundaries (Figure 8.7, Table 8.2).

Plans for 1988 include concentration on obtaining core from many of the new developments in the area.

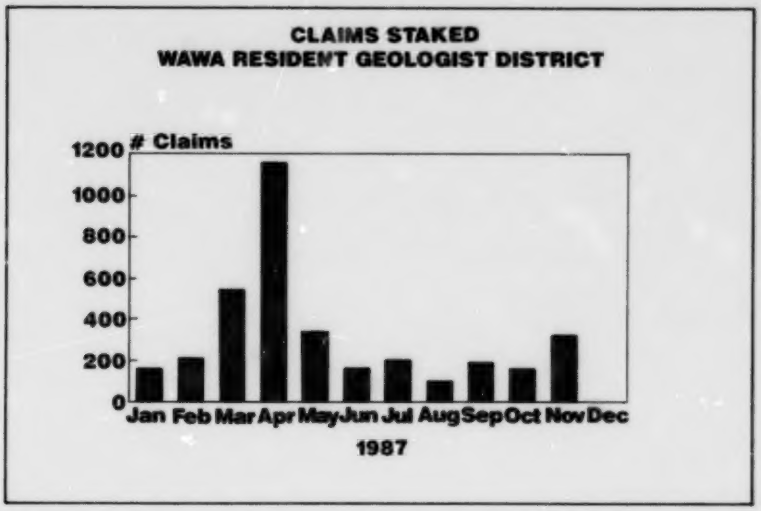

Figure 8.3. *Claim staking activity during 1987.*

Properties held by Muscocho Explorations Limited, Canamax Resources Incorporated, and Citadel Gold Mines Incorporated have all been targeted for donations in the new year. Furthermore, 10 drillholes from Lizar Township are available to the library; however, lack of access has prevented recovery of this core from Keltic Mining Company drilling until the spring. As well, staff at the core library are always seeking new donations from potential and proven areas in the Wawa District.

INSTITUTE ON LAKE SUPERIOR GEOLOGY

Wawa was the venue for the 33rd Institute on Lake Superior Geology. The May conference was hosted by the Wawa Resident Geologist's Office (WRGO) and the Ontario Geological Survey (OGS) and co-chaired by E.D. Frey (WRGO) and R.P. Sage (Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto). Two days of technical sessions and five field trips attracted a total of 255 geologists from across Canada and from many American states. Oral papers (34) and poster displays (29) covered many aspects of Lake Superior area geology. Wawa District geology was the topic of 17 of the presentations. Field trips examined the stratigraphy of the Michipicoten Greenstone Belt (Sage, OGS), Wawa gold mineralization (Frey, WRGO), the Kapuskasing uplift (J.A. Percival, Geologist, Geological Survey of Canada, Ottawa), the Hemlo gold deposit (T.L. Muir, Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto), and the George W. MacLeod Siderite Mine (Algoma Ore Division staff). K.H. Poulsen (Geologist, Geological Survey of Canada, Ottawa) spoke on "Tectonics and Gold" at the annual banquet. A Proceedings and Abstracts volume and four field trip guidebooks were published.

WAWA RESIDENT GEOLOGIST'S OFFICE PROGRAM

WAWA DISTRICT MINERAL DEPOSITS DATABASE by E.D. Frey

The Wawa District Mineral Deposits Database project began in mid-1987 as an ongoing effort to synthesize, into a microcomputer, retrievable format, geological, production, and locational facts on the numerous gold and base metal occurrences in the area. The project was financially supported by the Northern Ontario Regional Economic Development Program (NOR-DEV) and geological assistance in the compilation of mineral resources data was provided by R.C. Stewart.

The main objectives of the project are as follows:

1. to provide rapid access to data on specific occurrences
2. to consolidate facts from older government reports, assessment files, recent OGS mapping, and other observations
3. to explore geological relationships among deposits, using the multifactor retrieval ability of dBASE III+
4. to identify critical knowledge gaps within individual deposits or the database as a whole which would direct further study

A variety of mineral deposit databases have been published for all or parts of Ontario, for example Beard and Garratt (1976), Ferguson *et al.* (1971), Gordon *et al.* (1979), Shklanka (1968, 1969), and Wilkinson (1982). Although these inventories provide useful summaries within their own context, they are either geographically not applicable to the Wawa Resident Geologist's Area (WRGA) or cover only a few of its occurrences. Robinson (1983) produced the first summary of mineral deposit data exclusive to the WRGA. It was based on a thorough survey of Ontario Government publications and consists of a database of up to 12 items for each of 155 gold occurrences in the area between Wawa and Renabie.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 8.1

Number on Figure	Individual or Company	Activity
1.	ANGLO PORCUPINE GOLD MINES LTD.	STRIPPING, GEOCHEMISTRY, DRILLING, LEESON TWP.
2.	ATEBA MINES INC.	STRIPPING, STOVER TWP.
3.	BRIDGET LAKE RESOURCES INC. (FINNETH EXPLORATION INC.)	TRENCHING, GEOPHYSICS, GEOLOGY, DRILLING, RABAZO TWP.
4.	CANAMAX RESOURCES INC.	STRIPPING, TRENCHING, GEOLOGY, DRILLING, AGUONIE, FINAN, JACOBSON TWPS.
5.	CANREOS MINERALS LTD.	STRIPPING, DRILLING, GEOLOGY, BRACKIN TWP.
6.	CITADEL GOLD MINES LTD.	STRIPPING, TRENCHING, DRILLING, GEOLOGY, McMURRAY TWP.
7.	COMINCO LTD.	DRILLING, BRUYERE TWP.
8.	CONQUEST YELLOWKNIFE RESOURCES LTD.	PROSPECTING, GEOLOGY, DRILLING, LEESON, RENNIE, RIGGS TWPS.
9.	DELBRIDGE MINES LTD.	STRIPPING, TRENCHING, GEOPHYSICS, DRILLING, HOMER TWP.
10.	DOMINION EXPLORERS INC.	TRENCHING, GEOLOGY, DRILLING, MISHIBISHU LAKE, PUKASKWA RIVER AREAS
11.	DURHAM GEOLOGICAL SERVICES INC.	LINECUTTING, GEOPHYSICS, GEOLOGY, DERRY, HAWKINS TWPS.
12.	EGO RESOURCES LTD.	STRIPPING, TRENCHING, GEOLOGY, DRILLING, ABOTOSSAWAY TWP.
13.	ELSA DON EXPLORATIONS INC.	PROSPECTING, NAVEAU, RABAZO TWPS.
14.	ESSO MINERALS CANADA LTD.	STRIPPING, TRENCHING, DRILLING, JACOBSON TWP.
15.	FIRST GENERAL MINE MANAGEMENT & GOLD CORP.	PROSPECTING, STRIPPING, STOVER TWP.
16.	G.C. CLEMENT	LINECUTTING, STRIPPING, JACOBSON TWP.
17.	GOLDFIELDS CANADIAN MINING LTD.	PROSPECTING, STRIPPING, TRENCHING, DRILLING, HAWKINS TWP.
18.	GRANGES EXPLORATION LTD.	DRILLING, ST. GERMAIN TWP., MISHIBISHU LAKE AREA
19.	HAROLD JONES & ASSOCIATES LTD.	STRIPPING, TRENCHING, GEOPHYSICS, GEOLOGY, DAVID LAKE AREA
20.	HERB FUNK	STRIPPING, TRENCHING, DRILLING, LENDRUM TWP.
21.	JAMES TILSLEY & ASSOCIATES LTD.	PROSPECTING, STRIPPING, GEOLOGY, AGUONIE, ABOTOSSAWAY TWPS.
22.	JOHN McCOMBE	PROSPECTING, GEOPHYSICS, DRILLING, BRUYERE TWP.
23.	LONGREACH RESOURCES LTD. (OPERATION TRANS GOLD)	GEOPHYSICS, GEOCHEMISTRY, GEOLOGY, NAVEAU & VARIOUS ALGOMA CENTRAL RAILWAY TWPS.
24.	MASCOT GOLD MINES LTD. (OPERATION WAWA)	PROSPECTING, TRENCHING, GEOPHYSICS, DRILLING, ABOTOSSAWAY & VARIOUS ACR TWPS.
25.	McADAM RESOURCES INC.	LINECUTTING, DRILLING, ABOTOSSAWAY TWP.
26.	MONK GOLD & RESOURCES INC.	STRIPPING, DRILLING, RABAZO TWP.
27.	MUSCOCHO EXPLORATIONS LTD.	STRIPPING, TRENCHING, GEOLOGY, DRILLING, FINAN TWP., MISHIBISHU LAKE AREA
28.	NORANDA EXPLORATION CO. LTD.	PROSPECTING, STRIPPING, TRENCHING, GEOPHYSICS, GEOCHEMISTRY, GEOLOGY, DRILLING, DUNPHY, JACOBSON, RIGGS, ECHUM, DEBASSIGE, ESQUEGA, CHABANEL, BAILLOQUET TWPS., POINT ISACOR AREA
29.	OREQUEST CONSULTANTS LTD. (OPERATION WAWA)	TRENCHING, GEOPHYSICS, GEOCHEMISTRY, GEOLOGY, DRILLING, ABOTOSSAWAY & VARIOUS ACR TWPS.
30.	R.S. MIDDLETON EXPLORATION SERVICES	GEOPHYSICS, BRUYERE TWP.
31.	REED LAKE EXPLORATION LTD.	STRIPPING, TRENCHING, DRILLING, ESQUEGA TWP.
32.	SOOCANA EXPLORATION LTD.	TRENCHING, GEOPHYSICS, GEOLOGY, DRILLING, ESQUEGA TWP.
33.	SPIRIT LAKE EXPLORATION INC.	GEOCHEMISTRY, OVERBURDEN DRILLING, DRILLING, JACOBSON TWP.
34.	STAN KUSTEC (FINNETH EXPLORATIONS INC.)	STRIPPING, TRENCHING, RABAZO TWP.
35.	TECO RESOURCES LTD.	LINECUTTING, GEOPHYSICS, RIGGS TWP.
36.	TUNDRA GOLD MINES LTD. (NEW BEGINNINGS EXPLORATION LTD.)	PROSPECTING, GEOPHYSICS, GEOCHEMISTRY, DRILLING, GROSEILLIERS TWP., PILOT HARBOUR, ABBIE LAKE AREAS
37.	WATSON LAKE EXPLORATION LTD.	PROSPECTING, STRIPPING, RIGGS TWP.
38.	CLINE DEVELOPMENT INC.	STRIPPING, GEOLOGY, GEOPHYSICS, DRILLING, FINAN, JACOBSON TWPS.
39.	GOLDEN POINT EXPLORATION LTD.	STRIPPING, TRENCHING, SAMPLING, DRILLING, McMURRAY TWP.
40.	PETER NABIGON	PROSPECTING, TRENCHING, DRILLING, ODLUM TWP.
41.	LONGOLD RESOURCES INC.	GEOPHYSICS, GEOLOGY, DRILLING, FINAN TWP.
42.	NEW BEGINNINGS RESOURCES INC.	DRILLING, WEST TWP.

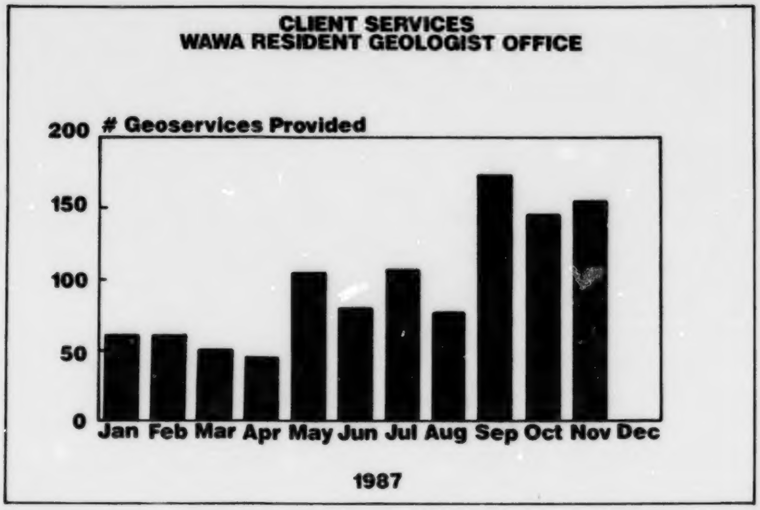

Figure 8.4. *Client services during 1987.*

The present project used the occurrences identified by Robinson (1983) as a starting point. Robinson's summaries were augmented, and additional properties added from the exhaustive review of assessment and company files and original observations of occurrences in twelve townships by Sage (in press) and in four townships by Massey (1985). Valuable additional information was supplied by the detailed observations of selected gold occurrences and regional structures in the Goudreau area by Heather and Arias (1987) and Arias and Heather (1987).

Initially, a large database form of 128 fields was constructed with dBASE III+ software to record geological parameters of lithology, mineralization, alteration, metamorphism, structure, deposit form, and host rock relationships, in addition to locational data and production history. The fields used were adopted, in part, from the OGS computer-based field note format of Stott (Geologist, Precambrian Geology Section, Ontario Geological Survey, personal communication, 1987) and Hodgson's (1983) approach to computer filing of gold deposit data.

Trial application of existing mineral occurrence data quickly illustrated the absence of detailed information for most properties. Continued refinements have reduced the number of fields in use to 62 (December 1987). Although far from recording a complete geological picture of each occurrence, the reduced form provides a concise means of documenting our present state of knowledge. Database fields, not useable with present data, outline numerous topics for further research.

The flexible, multifactor retrieval ability of dBASE III+ allows for efficient searching for factor similarities and other comparisons among mineral deposits. Future refinements will include expansion of the search capability by placing more descriptive information into appropriate fields and a systematic upgrading of the contents by field work. The database now contains over 200 occurrences that range in significance from present and past producing orebodies to unexplored showings.

EVALUATION OF MINERAL RESOURCES, GRANITIC AND GNEISSIC TERRANES, WAWA AREA by A. Wilson

Introduction

An evaluation of the industrial mineral and building stone potential of the Wawa area began in May 1987. This project is funded through the Northern Development Fund, and assistance during the summer and fall was provided by R.C. Stewart. This project evolved from both the industrial minerals project undertaken by J.J. Kral (1987), and the Algoma Reconnaissance Geology project completed by D.J.J. Tortosa (1987). Both earlier programs were initiated out of the Sault Ste. Marie Resident Geologist's Office.

Since both of these projects covered the entire Sault Ste. Marie Mining Division, approximately only one-third of what is now the Wawa area was assessed for its building stone and industrial mineral potential. The establishment of a Resident Geologist's Office in Wawa, and the increased exploration activity in the area, have demonstrated the need for an investigation of this type.

Previous studies of granitic rocks in the area have been restricted to very brief coverage in the geological reports concerning the area. In addition, the evaluation of industrial mineral and building stone deposits in the area has been restricted to a few references by Hewitt (1964), Vos *et al.* (1987), and Kral (1987).

The intentions of this project are, therefore a) to structurally analyze the internal and external granitoids, b) to delineate target areas of suitable building or ornamental stones, c) to examine deposits with industrial mineral application and potential, d) to assess the rare-earth element potential and other granitoid-related industrial mineral occurrences, e) to assess the economic potential of selected deposits, and f) to promote the unique stones found in the area.

TABLE 8.2. DRILL CORE COLLECTED FROM THE WAWA DISTRICT IN 1987.

Company	Township
Mascot Gold Mines Limited	Odlum Hambleton
Conquest Yellowknife Resources Ltd.	Rennie Brackin West
Falconbridge Nickel Limited	Hawkins
Cline Development Corporation	Jacobson
Dome Exploration Limited	Stover Meath Rennie West

Field work began in July 1987, after a very brief review of the available literature. Activity was concentrated in the western portion of the area and covered the surveyed townships in the area between White River to the west and Dubreuilville to the east (Figure 8.5). Mapping in this area, and in areas to be covered in successive field seasons, will augment the observations made by Tortosa (1987). This area was chosen to approximately correspond with area 3 outlined by Tortosa (1987). Access is by truck and all-terrain-vehicle over a complex system of logging roads. Lakes in the region provide additional access by boat, canoe, or float plane.

Methodology

Although granite is not the only stone used for building or decorative purposes, it is the major dimension stone quarried in northwestern Ontario, and has the most potential for the Wawa area. During the 1987 field season, granitoid rocks were examined almost exclusively. Other lithologies with dimension stone or industrial mineral potential will be examined as they are encountered in successive field seasons.

All prospects were described using the following criteria, which were drawn from various sources, including Storey (1986), Brisbin (1980) and Currier (1960).

1. Fractures and jointing were measured as the major structural elements of the prospects. These structures control the maximum size of blocks that can be extracted from the prospect. Orientation, density, and spacing of joints and/or fracture systems were measured, and included the observation and spacing of horizontal sheets or joints. In addition, the composition and degree of fracture filling or alteration along the fractures were also recorded.
2. The colour and texture of the granitoid body were also recorded. Both of these features must be consistent in order to make the deposit marketable. The colour recorded in the field was that observed on the fresh surface and was classified according to the traditional commercial categories (white and grey, coloured, variegated, and black). Slabbing and polishing these specimens will affect the perceived surface colour. A highly polished surface will appear darker than a sawn or sandblasted surface, and this contrast should be considered for rocks that are to be used for ornamental purposes.

   Uniform textures, or textures which are consistently nonuniform in an interesting fashion, are desirable in a building stone (Storey 1986). Traditionally, the granitoid prospects considered for dimension stone are even textured or porphyritic. Other textural features such as pegmatite patches and foliation are undesirable unless the stone is quarried for a specific architectural accent. To this end, an approximation of the pegmatite content of the outcrop was also made during initial field observations.
3. The presence or absence of deleterious minerals, or inclusions, was also observed. Sulphide minerals break down rapidly and soft ferromagnesian minerals take on a poor polish. Rough estimations of the sulphide and ferromagnesian components of the granitoids were made in the field. These estimates will be revised with petrographic examination of the rocks.
4. Characteristic variations in each outcrop location were also recorded. These variations include pervasive alteration, inclusions, segregations, and specific fabrics present in outcrop.

Exploration Potential

Two granitoid bodies examined during the 1987 field season show considerable potential for use as dimension stone. Both bodies exhibit desirable characteristics that will be further examined before they are recommended for production. Approximate boundaries of these intrusive bodies are outlined on Figure 8.5.

One body consists of massive, homogeneous, equigranular, grey granodiorite which outcrops west of White River on Highway 17. Outcrops of similar lithology also outcrop in the vicinity of the Bremner River south of White River.

The second granitoid prospect occurs sporadically along Highway 631, north of White River and along the system of logging roads immediately north of the Domtar mill. This prospect consists of dark grey, equigranular, medium-grained, and homogeneous diorite.

Both bodies will be systematically mapped and outlined in the forthcoming field season in order to better define the dimension stone potential. This will be augmented by petrography and geochemistry to be completed this winter. Initial investigation indicates that, because of their close proximity to major transportation systems (both highway and railway), both of these bodies have great potential for development.

GEOLOGICAL DATA INVENTORY FILE PROGRAM by W. Wing and D.J.J. Tortosa

The Wawa Resident Geologist's Office continued to produce and update Geological Data Inventory Files (GDIFs) during 1987 under the direction of W. Wing. Updates for previously compiled GDIFs were com-

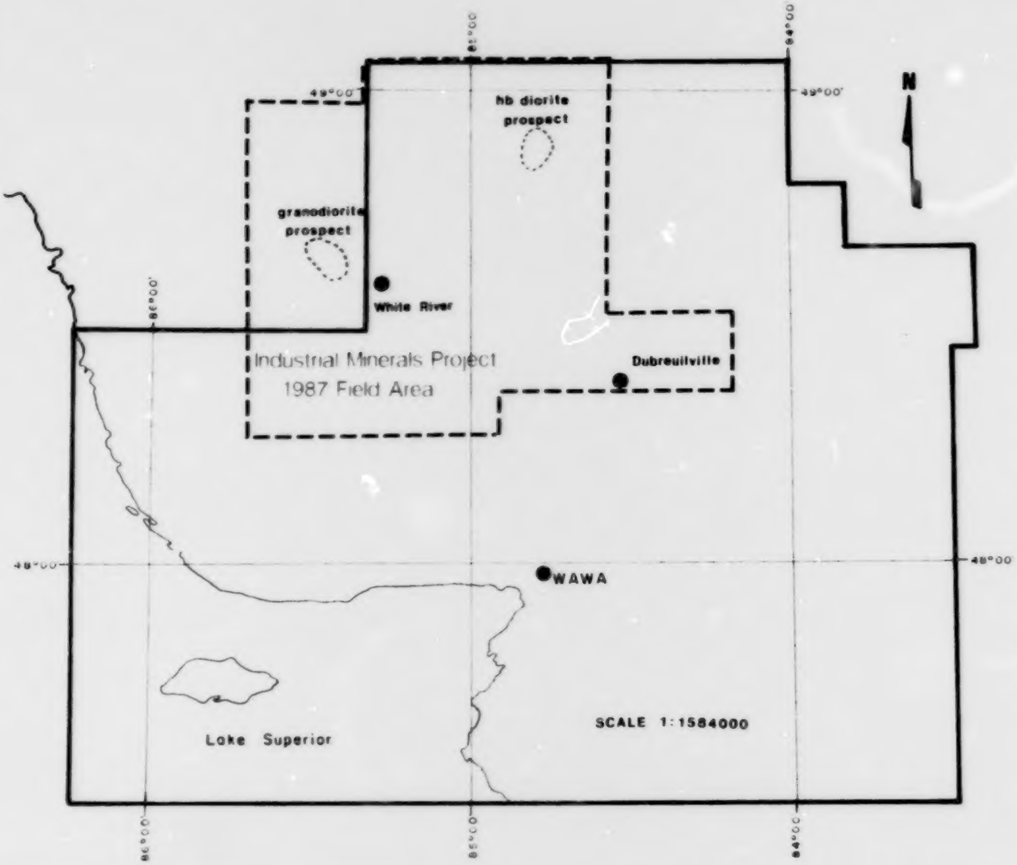

Figure 8.5. Industrial Minerals project, location map.

pleted for townships with high exploration activity. To date, the Wawa Office has 64 GDIFs available for sale to the public and exploration companies (Table 8.3); they comprise 30 percent of all townships in the area, and 64 percent of townships with above average gold potential (*see* Figure 08.6). As well, Geological Data Inventory Folios were entered onto a computer database which allows for a more efficient method of updating and publication.

ALGOMA CENTRAL RAILWAY EXPLORATION FILE CONSOLIDATION by L. Ashick

The consolidation of Mineral Exploration Files Project began in June 1987. The work was carried out by Lorry Ashick, Joseph Melisek, and Ed Haley.

The objectives of this project are to

1. compile information found in the Algoma Central Railway (ACR) files that is missing from the Wawa Assessment Files and incorporate it into the files
2. compile Algoma Ore Division (AOD) data that were previously unavailable to the public, missing from the Wawa Assessment Files, and incorporate it into the files
3. update published Geological Data Inventory Folios (GDIFs) to include the new information obtained from the ACR, AOD, and recent assessment work that has been added to the Wawa Assessment Files.

The addition of this information to the Resident Geologist's Office will benefit the public, enabling them to find all the information available on a particular township or area in one office.

As of November 1987, all of the information that the Algoma Central Railway had on file in their office had been compared to the Wawa Assessment Files, and copies of the new information had been made. The next stage will be to have this information put onto microfiche and incorporated into the present filing system. New information has been obtained on 108 townships in the Sault Ste. Marie Mining Division and, of these townships, 29 are controlled by the ACR with the remainder being controlled by the Crown (Figure 8.7).

MINING ACTIVITY

The Algoma Ore Division of The Algoma Steel Corporation Limited continued to mine siderite iron ore at the George W. MacLeod Mine in Wawa during 1987. Production for 1987 through to the end of November

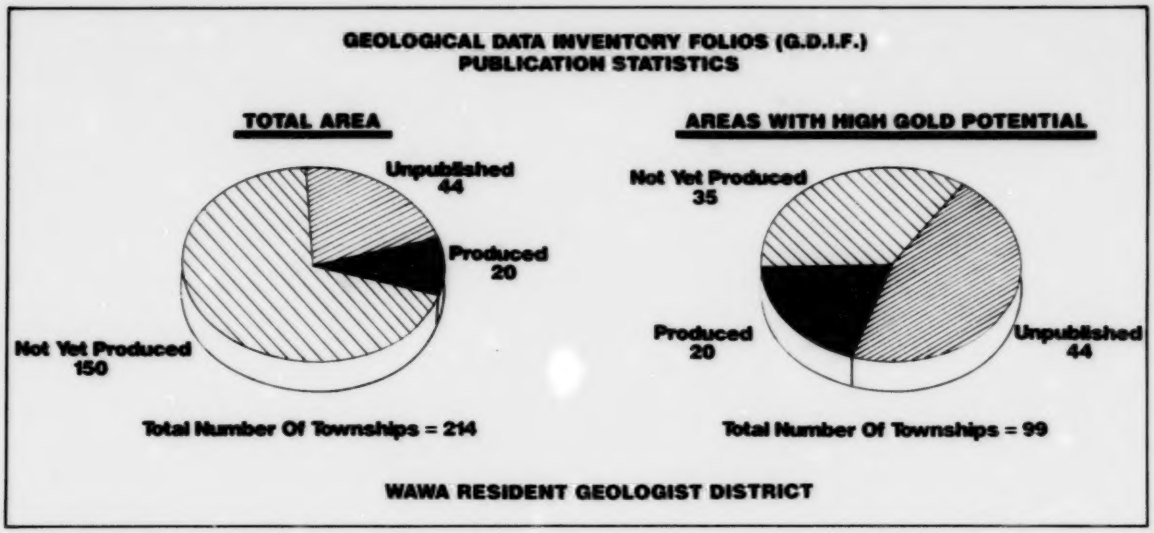

Figure 8.6. *Geological Data Inventory Folios, publication statistics.*

was 990 000 gross tons of sinter from 1 338 849 tons of ore. The company implemented a method of statistical process control for their mine operations which significantly improved the quality control of ore-grade and the overall efficiency of the operation. The Algoma Ore Division had an employment force of 353 as of November 1987.

At the Renabie Mine, production up until December 1987, was 225 000 tons grading 0.202 ounce gold per ton. All present mining activity is below the 3200-foot level and access to the orebody below the 3105-foot level is by ramp and a winze.

The mill has a capacity of 725 tons per day, with mine production at 725 tons per day. The orebody continues to be mined using a sublevel caving method, and all production was taking place on the 3375- and 3415-foot sublevels as of December 1987. Throughout 1987, development occurred on the 3455-, 3495-, and 3930-foot levels. A winze, completed in 1986 from the 3105- to 4300-foot levels, has working levels at 4105 and 4245 feet below surface. From October 1986, to October 1987, a total of 8786 feet of development drifting was completed on seven levels between the 3330- and 3930-foot sublevels, from the new winze. A 20 000-foot underground diamond drill program was completed from the 3375-, 3430-, 3510-, and the 4245-foot levels to delineate ore reserves. A high-grade zone was discovered on the 3930-foot sublevel averaging 0.8 ounce gold per ton in a quartz pod 20 to 35 feet wide. Proven ore reserves are 1.2 million tons grading 0.2 ounce gold per ton using a 0.15 ounce gold per ton cutoff.

Canreos Minerals (1980) Limited mined 65 000 tons of silica/gold ore grading 0.15 ounce gold per ton, plus 30 000 tons of low grade ore with an estimated grade of 0.06 ounce gold per ton. A total of 58 000 tons of silica/gold ore was shipped to the Kidd Creek smelter in Timmins for use as silica flux. The low-grade stockpile is being considered for vat-leaching. The mine operation is centred on the '21-vein' which has been developed by open pit and a decline accessing two levels.

EXPLORATION AND UNDERGROUND DEVELOPMENT ACTIVITY

WAWA–MICHIPICOTEN AREA

Citadel Gold Mines Incorporated dewatered and completed an underground re-evaluation of the Surluga Mine (past producer). Underground development consisted of 580 feet of drifts and crosscuts, geological mapping, sampling, and 35 000 feet of underground drilling. The Surluga Mine is comprised of seven levels to a depth of 950 feet with the ore zones occurring in a north-trending fault zone dipping 30° to 40° to the east.

A surface drilling program centred on the southern extension of the fault zone resulted in the discovery of a new ore zone south of the Surluga Mine. The surface drilling amounted to 40 000 feet and new ore reserves are estimated at 1 million tons at 0.2 ounce gold per ton adding to the estimated 1.4 million tons at 0.18 ounce gold per ton in the Surluga Mine. Rehabilitation of the mill is being planned for a 500 tons per day production from the Citadel properties, and 250 tons per day for custom milling.

The Jubilee Mine (past producer) which is situated about 1 km south of the Surluga Mine was dewatered and the upper levels were mapped and sampled. Citadel plans to access the downdip continuation of the Jubilee ore zone by drifting south from the deeper levels of the Surluga Mine.

Surface mapping over the property was completed during the summer and the overburden was stripped over the Cooper, Minto, Parkhill, and Darwin Mine areas. Gold mineralization occurs in pods and lenses of quartz contained within shear zones ranging from 1 m up to 15 m wide and extending up to 300 m. The shear zones are characterized by the presence of sheared mafic lithologies (gabbro/diorite) which have undergone intense carbonatiza-

TABLE 8.3. GEOLOGICAL DATA INVENTORY FOLIOS AVAILABLE FOR VIEWING AT THE WAWA RESIDENT GEOLOGIST'S OFFICE. (FOLIOS COMPILED IN 1986 BY STAFF OF THE SAULT STE. MARIE RESIDENT GEOLOGIST'S OFFICE).

Unpublished GDIF's		Published GDIF's
Abbie Lake	Marsh	Rabazo
Abotossaway	McMurray	Jacobson
Andre	Meath	Nebonaionquet
Bailloquet	Menzies	Naveau
Bostwick	Mishibishu L.	Finan
Chabanel	Nebonaionquet	Bird
Dahl	Odlum	Aguonie
Dambrossio	Pukaskwa	Cowie
David Lakes	Rennie	Debassige
Dulhut	Stover	Echum
Esquega	Camp Lake	Glasgow
Hambleton	Chapais	Dumas
Knicely	Charbonneau	Dunphy
Lalibert	Franchere	Bruyere
Lastheels	Groseilliers	Copenance
Leclaire	Jarvey Lake	Musquash
Lendrum	Keating	Corbiere
Macaskill	Killins	Dolson
St. Germain	Legarde	Riggs
Warpula	Levesque	West
Michipicoten Is.	Pilot Harbour NE	
Point Isacor	Pilot Harbour NW	

tion with a lesser degree of potassic alteration (development of biotite).

Reed Lake Exploration Limited completed overburden stripping, trenching, sampling, and diamond drilling on the Holdsworth Property 3 km north of Hawk Junction. The diamond-drill program outlined a small, high grade quartz vein to a depth of 250 feet and a new vein system was discovered. The gold-bearing quartz-carbonate vein occupies a carbonatized shear zone within mafic volcanics and extends 300 m in an east-northeast direction.

Soocana Explorations Limited completed overburden stripping, trenching, sampling, and mapping the Blacksmith and Murray-Algom Properties in Esquega Township, 3 km east of Hawk Junction. Diamond drilling is planned during the Winter of 1988. The Blacksmith Vein consists of steeply dipping pods and lenses of massive quartz, trending east-northeast, and contained within carbonatized, sheared metavolcanics. The Murray-Algom Occurrence consists of irregularly striking and dipping quartz veins within intermediate to felsic metavolcanics.

The Monk Gold and Resources Limited property in Rabazo Township has been optioned by C. Kuryliw who completed a drill program to test several nearly flat-lying gold-bearing quartz veins. The Monk Gold Prospect consists of a 30 to 50 m wide vertically dipping shear zone (quartz-sericite schists) containing quartz veins concordant with the schistosity, and veins crosscutting at shallow dips (5° to 15°). Gold is associated with sulphides contained within the shallow dipping vein system.

Longreach Resources Limited and Trans Gold Resources Limited optioned nine townships from the Algoma Central Railway under a joint venture called Operation Trans Gold. The properties cover both granitoid and greenstone terranes, with exploration activity centred on greenstone in Naveau and Nebonaionquet Townships. Surface exploration consisted of mapping, sampling, and diamond drilling programs over several grids, and an airborne geophysical survey.

FinNeth Exploration Limited optioned the Ranson Property from G. Longhurst (Bridget Lake Resources Limited) and an adjacent claim group from S. Kustec (prospector). Surface exploration focused on the Ranson Property and consisted of geological mapping, sampling, and ground geophysics (induced polarity (IP)). A winter diamond drill program is planned for 1988. Gold mineralization occurs in quartz veins which may or may not occupy shear zones within quartz-feldspar porphyry and mafic metavolcanic/gabbro. Veins generally trend northwesterly, dip steeply, and range from 30 cm to 3 m in width.

GOUDREAU–LOCHALSH AREA

Muscocho Explorations Limited continued exploration drifting on the 100- and 200-foot levels of the Magino Deposit, and extended the ramp in order to access the old workings at the 250-foot level. A number of ore raises were driven from the 200- to the 100-foot level in order to test the continuity of structures and ore grades. Published drill-estimated reserves are 1.96 million tons at 0.25 ounce gold per ton.

A surface drill program was completed in the mine area in order to better delineate the ore zone and its depth extension. During the summer, detailed underground mapping of the ore zones was completed by S. Markel, Mine Geologist. A.J. Deevey joined the mine operation as Chief Geologist in July.

TABLE 8.4. MAPS AND REPORTS PERTAINING TO THE WAWA DISTRICT PUBLISHED DURING THE YEAR.

Ontario Geological Survey

Open File 85
Open File 86
Open File 87
Open File 88

Geological Survey of Canada

Open File 1357

Gold mineralization occurs in siliceous zones and quartz veins within sheared portions of the Webb Lake granodiorite-trondhjemite stock. The location of the ore zones and shear zone orientations line up with the Goudreau Lake lineament (or shear) on which Canamax Resources Incorporated made a significant discovery.

In July 1987, Muscocho Explorations Limited and McNellen Resources Incorporated announced the installation of a 400 tons per day gold test mill at the Magino Mine site, at an estimated cost of $5 million. Erection of the test mill was completed in December. Once in full operation the mill will also be available for bulk sampling of ore from other interested parties.

Canamax Resources Incorporated announced a production decision on its Kremzar Gold Property for September 1988, with a mill to be built on-site having a capacity of 500 to 800 tons per day. Annual production is estimated at 32 000 ounces of gold at an operating cost of $295 per ounce. Drill-indicated reserves have been estimated at 1.1 million tons at 0.235 ounce gold per ton. Development of the Kremzar Property was formerly a 50/50 joint venture with The Algoma Steel Corporation Limited. Canamax purchased the remaining 50 percent for $9 million and granted Algoma Steel Corporation Limited a net smelter return of 4 percent after payback.

During the latter part of the year, Canamax Resources Incorporated contracted Mining Corporation to complete preproduction development of the orebody using a spiral ramp to the 240 m level in order to access the ore from the footwall. The preferred mining method will be sublevel retreat and mechanized cut-and-fill.

In February 1987, Canamax Resources Incorporated announced a new gold discovery under Goudreau Lake, 2 km south of the Kremzar Gold Deposit. Drill intersections of up to 30.9 g/t over 5.3 m were encountered. The mineralization is related to the Goudreau Lake shear which trends in an east-northeast direction, and which also hosts the Magino Deposit (Muscocho Explorations Limited) several kilometres to the west-southwest. Gold mineralization encountered during the Canamax drilling occurs within siliceous sections in a quartz-sericite schist host. The main controlling structure (the Goudreau Lake shear) forms part of the Goudreau Lake Deformation Zone (Heather and Arias 1987), which is a 4.5 km wide zone of high strain straddling a major felsic-mafic metavolcanic contact. The western part of the mineralized zone occurs wholly on Canamax property; the eastern portion occurs on joint venture property between The Algoma Steel Corporation Limited and Canamax Resources Incorporated.

Ego Resources Limited completed a surface exploration program in the Ego Mine area. Work consisted of stripping, mapping, trenching, and diamond drilling. Gold mineralization occurs with chalcopyrite, pyrite, and pyrrhotite in quartz-carbonate veins within sericitized shear zones. The mineralized zones occur in close proximity to the contact between the Gutcher Lake stock (felsic to intermediate composition) and surrounding intermediate to mafic metavolcanics.

Esso Minerals Canada completed a surface exploration program on the Markes Occurrence in Jacobson Township. Work consisted of stripping, trenching, and diamond drilling. Gold mineralization is associated with discrete shears within a 20 m wide deformation zone straddling the contact between mafic metavolcanics/intrusive rocks and felsic intrusive rocks (quartz-feldspar porphyry).

Galveston Resources Limited has been active on 13.5 townships leased from the Algoma Central Railway. Exploration in 1987 consisted of a winter program of 43 diamond-drill holes (27 897 feet) in the old Murphy Mine area west of Goudreau to test several mineralized zones. A fall exploration program consisted of 20 000 feet of surface diamond drilling in the Murphy Mine area to follow the mineralized zone on-strike and downdip, 20 000 feet of diamond drilling to test other mineralized zones in the area, and detailed prospecting and geochemical sampling. A detailed airborne geophysical survey was flown to help define target areas. Total expenditures for the program for 1987 were $3 million.

Noranda Exploration Company Limited optioned the Cline Property in north-central Jacobson Township from Cline Development Corporation. Throughout 1987 exploration focussed on the Cline Lake area and consisted of overburden stripping, sampling, and diamond drilling. Gold mineralization occurs in quartz and quartz-carbonate veins associated with the sheared contact between mafic metavolcanics and a quartz-eye porphyry. Gold appears to be associated with minor sulphide mineralization in the form of pyrite and pyrrhotite. A total of 25 diamond-drill holes were placed to test the mineralized zone along strike. Encouraging results were obtained (0.6 ounce gold per ton over 3 feet).

Cline Development Corporation continued surface exploration in the Goudreau-Lochalsh area, following-up on 27 airborne anomalous zones with overburden stripping, trenching, sampling, and diamond drilling. A number of mineralized zones were identified for further work.

Spirit Lake Exploration Limited completed a surface exploration program consisting of sonic soil sampling and diamond drilling. The claim group includes the Edwards Mine (past producer) and is situated about 1 km west of the Cline Mine (Noranda Exploration Company Limited). Gold mineralization occurs in quartz veins hosted in both felsic intrusions

TABLE 8.5 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AIR MAG	Airborne Magnetometer Survey	OB	Overburden
AG	Silver	PB	Lead
AS	Arsenic	PROP EVAL	Property Evaluation
AU	Gold	PROS	Prospecting
CU	Copper	RES	Resistivity Survey
DH	Diamond-Drill Hole	SMPL	Sampling
EM	Electromagnetic Survey	SN	Tin
GEOCHEM	Geochemistry Survey	STRIP	Stripping
GEOL	Geology Survey	TR	Trenching
GND MAG	Ground Magnetometer Survey	UG	Underground
HEM	Horizontal Loop EM Survey	VLF	Very Low Frequency Survey
IP	Induced Polarization Survey	WR	Whole Rock
MAG	Magnetometer Survey	ZN	Zinc
MO	Molybdenum		

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ABBIE LAKE	42C/03NW	MACMILLAN ENERGY CORP LTD.	AU	ASSES	1 DH 49.99M	1986	DD.14	WP-ABBIE LAKE-1
ABBIE LAKE	42C/03NW	GRANGES EXPLORATION LTD.	AU	ASSES	4 DH 255.41M	1986	DD.15	WP-ABBIE LAKE-2
ABOTOSSAWAY	42C/7SE 42C/2NE	M.E.R.I.T. MINERAL EXPLORATION RES.	AU	ASSES	GEOL, ASSAYS, (AU,SN) GEOCHEM (WR)	1986	2.9458	WP-ABOTOSS-AWAY-1
ABOTOSSAWAY	42C/7SE 42C/2NE	PRECAMBRIAN EXPLORATION	AU	ASSES	MAG, EM, GND	1986	2.9471	WP-ABOTOSS-AWAY-2
ABOTOSSAWAY	42C/7SE 42C/2NE	AMAX OF CANADA LTD.	AU,AG,PB, ZN,CU,NI	DONATED	4 DH 1,313', HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
ABOTOSSAWAY	42C/7SE 42C/2NE	FALDO MINES & ENERGY CORP.	AU	ASSES	GEOCHEM (HUMUS) (AU,ZN,AS)	1987	2.10416	WP-ABOTOSS-AWAY-3
AGUONIE	42C/2NE 42C/1NW	PRECAMBRIAN EXPLORATION	AU	ASSES	ND, MAG, EM	1986	2.9471	WP-ABOTOSS-AWAY-2
BAILLOQUET	42C/2SW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	ASSAYS (AU), GEOL	1986	2.9627	WP-BAILLO-QUET-1
BAILLOQUET	42C/2SW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	MAG	1987	2.99000	WP-BAILLO-QUET-2
BAILLOQUET	42C/2SW	MIDWAY EXPLORATIONS	AU	ASSES	GEOL	1987	2.10014	WP-BAILLO-QUET-3
BAILLOQUET	42C/2SW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU,AS,AG,CU,MO, PB, ZN), GEOCHEM (WR)	1987	2.9837	WP-CHABANEL -2
BIRD	42C/8Sw 42C/1NW	AMAX OF CANADA LTD.	AU,AG,PB, ZN,CU,NI	DONATED	4 DH 1,313', HEM,VLF, MAG	1979	PENDING	WP-KILLINS-1
BRACKIN	42B/5	CONQUEST YELLOWKNIFE RESOURCES LTD.	AU	ASSES	4 DH 1974'	1987	DD.19	WT-BRACKIN-1
BRACKIN	42B/5	CONQUEST YELLOWKNIFE RESOURCES LTD.	AU	ASSES	1 DH 450'	1987	DD.20	WT-BRACKIN-2
BRACKIN	42 B/5	CONQUEST YELLOWKNIFE RESOURCES LTD.	AU	ASSES	1 DH 450'	1987	2.10048	WT-BRACKIN-3
BRACKIN	42B/5	CANREOS MINERALS LTD., KIDD CREEK MINES LTD.	AU	OMEP	BULK SMPL (AU), 13 DH 5,041'	1984-85	63.4607	WT-BRACKIN-4
BRACKIN	42B/5	CANREOS MINERALS LTD.	AU	ASSES	DH LOCATION, INVOICES FOR ASSAYS	1987	2.10281	WT-BRACKIN-5
BRACKIN	42B/5	CANREOS MINERALS LTD.	AU	ASSES	INVOICES FOR ASSAYS	1987	2.10280	WT-BRACKIN-6
BRUYERE	42C/1	TENOGA CONSULTANTS INC.	AU	ASSES	GEOL, ASSAYS (AU)	1986	2.9654	WP-BRUYERE-1
BRUYERE	42C/1	TENOGA CONSULTANTS INC.	AU	ASSES	GEOL, ASSAYS, GEOCHEM (AU,CU, PB,ZN,AG)	1987	2.9858	WP-BRUYERE-2
CHABANEL	42C/2S	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU, AS), GEOCHEM (WR)	1987	2.9823	WP-CHABANEL -1
CHABANEL	42C/2S	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU,AS,AG,CU,MO, PB, ZN) GEOCHEM (WR)	1987	2.9837	WP-CHABANEL -2
CHABANEL	42C/2S	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GND MAG, EM	1987	2.9948	WP-CHABANEL -3
CHABANEL	42C/2S	NORANDA EXPLORATION CO. LTD.	AU	ASSES	1 DH 22.84M	1986	DD.23	WP-CHABANEL 4

TABLE 8.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
CORBIERE	42C/2NE 42C/2SE	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU,AS), GEOCHEM (WR)	1987	2.9863	WP-CORBIERE-1
DAVID LAKE	42C/4SE	WASABI RES. LTD.	AU	ASSES	3DH 644'	1986	DD10	WP-DAVID LAKES-2
DAVID LAKE	42C/4SE	WASABI RES. LTD.	AU	ASSES	4DH 841'	1986	DD11	WP-DAVID LAKES-5
DAVID LAKE	42C/4SE	NORANDA EXPL. CO. LTD.	AU	ASSES	GEOL, PROS, GEOCHEM (SOIL) (AU)	1987	2.10277	WP-POINT ISACOR-2
DAVID LAKE	42C/4SE	DOMINION EXPLORERS INC.	AU	ASSES	4 DH 841', ASSAYS (AU)	1986	2.10161	WP-DAVID LAKES-3
DAVID LAKE	42C/4SE	HARBINSON, V.N.	AU	OMEP	GEOL, PROP EVAL	1985	63.4575	WP-DAVID LAKES-1
DAVID LAKE	42C/4SE	O'BRIEN ENERGY RES LTD., CHAVIN OF CANADA LTD., WASABI RES	AU	OMEP	GEOL, GEOCHEM, TR, ASSAYS (AU)	1986	63.4590	WP-DAVID LAKES-2
DERRY	42C/16 42F/1	CLEYO RESOURCES INC.	AU	ASSES	AIR MAG, EM	1987	2.9917	WT-DERRY-1
DERRY	42C/16 42F/1	MILLSTREAM MINES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10032	WT-DERRY-2
DERRY	42C/16 42F/1	FLORENTINE MINERAL RESOURCES LTD.	AU	ASSES	GND MAG, EM	1987	2.10046	WT-DERRY-3
DERRY	42C/16 42F/1	RIVER OAKS GOLD RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10124	WT-DERRY-4
ERMINE	42C/16	RIVER OAKS GOLD RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10254	WT-HAWKINS-1
FINAN	42C/8 42C/7	MUSCOCHO EXPLORATIONS LTD.	AU	ASSES	GEOL	1986	2.9497	WP-FINAN-1
FINAN	42C/8 42C/7	CANAMAX RESOURCES INC.	AU	ASSES	AIR MAG, EM	1986	2.9587	WP-FINAN-2
FINAN	42C/8 42C/7	CLINE DEVELOPMENT CORP.	AU	ASSES	ASSAYS, (AU), TR,OB GEOCHEM	1987	2.9985	WP-FINAN-3
FINAN	42C/8 42C/7	CLINE DEVELOPMENT CORP.	AU	ASSES	OB,DH	1987	2.9987	WP-FINAN-4
FINAN	42C/8 42C/7	McADAM RESOURCES INC.	AU	ASSES	GND MAG, EM	1987	2.10057	WP-FINAN-5
FINAN	42C/8 42C/7	McADAM RESOURCES INC.	AU	ASSES	GND MAG, EM	1987	2.10058	WP-FINAN-6
FINAN	42C/8 42C/7	MUSCOCHO EXPLORATIONS LTD.	AU	ASSES	3DH 1,111'	1986	DD.20	WP-FINAN-7
FINAN	42C/8 42C/7	MUSCOCHO EXPLORATIONS LTD.	AU	ASSES	17 DH 9,145'	1987	DD.21	WP-FINAN-8
FINAN	42C/8 42C/7	MUSCOCHO EXPLORATIONS LTD.	AU	OMEP	29 DH 16,441', ASSAYS (AU)	1985	63.4620	WP-FINAN-9
FINAN	42C/8 42C/7	CLINE DEVELOPMENT CORP.	AU	ASSES	TR	1987	2.9986	WP-FINAN-10
FINAN	42C/8 42C/7	LONGOLD RES. INC.	AU	ASSES	GND MAG, EM	1987	2.10344	WP-FINAN-11
FRANCHERE	42C/3SE 41N/14NE	NEW BEGINNINGS RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10141	WP-FRANCHERE-1
HAWKINS	42C/16 42F/1	RIVER OAKS GOLD RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10254	WT-HAWKINS-1
HAWKINS	42C/16 42F/1	HAWK RES INC.	AU	ASSES	AIR MAG, EM	1987	2.10252	WT-HAWKINS-2
IRVING	42C/16	RIVER OAKS GOLD RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10254	WT-HAWKINS-1
JACOBSON	42C/8SW	CLINE DEVELOPMENT CORP.	AU	ASSES	ASSAYS (AU), TR, OB, GEOCHEM	1987	2.9985	WP-FINAN-3
JACOBSON	42C/8SW	CLINE DEVELOPMENT CORP.	AU	ASSES	OB, DH	1987	2.9987	WP-FINAN-4
JACOBSON	42C/8SW	CYMBAL RESOURCES CORP.	AU	ASSES	GND MAG, EM	1986	2.9666	WP-JACOBSON-1
JACOBSON	42C/8SW	CLINE DEVELOPMENT CORP.	AU	ASSES	GND MAG, EM	1987	2.9983	WP-JACOBSON-2

TABLE 8.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
JACOBSON	42C/8SW	ESSO RESOURCES CANADA LTD.	AU	ASSES	3 DH 250.8M	1986	DD.35	WP-JACOBSON -3
JACOBSON	42C/8SW	CLINE DEVELOPMENT CORP.	AU	ASSES	2 DH 608.8'	1987	DD.36	WP-JACOBSON -4
JACOBSON	42C/8SW	LINCOLN RESOURCES INC.	AU	OMEP	GND MAG	1985	63.4583	WP-JACOBSON -5
JACOBSON	42C/8SW	CLINE DEVELOPMENT CORP.	AU	OMEP	PROP EVAL	1984	63.4587	WP-JACOBSON -6
JACOBSON	42C/8SW	SPIRIT LAKE EXPL. LTD.	AU	ASSES	TILL SMPL, 14 DH 394', ASSAYS (AU)	1987	2.10255	WP-JACOBSON -7
JACOBSON	42C/8SW	SPIRIT LAKE EXPL. LTD.	AU	ASSES	GND MAG, EM	1987	2.10292	WP-JACOBSON -8
JACOBSON	42C/8SW	SPIRIT LAKE EXPL. LTD.	AU	ASSES	GND MAG, EM	1987	2.10449	WP-JACOBSON -9
JACOBSON	42C/8SW	CLINE DEVELOPMENT CORP.	AU	ASSES	TR, ASSAYS (AU)	1987	2.9986	WP-FINAN-10
KEATING	42C/6S 42C/3N	AMAX OF CANADA LTD.	AU,AG,PB, ZN,CU,NI	DONATED	4 DH 1,313', HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
KILLINS	42C/3NE 42C/6SE	AMAX OF CANADA LTD.	AU,AG,PB ZN,CU,NI	DONATED	4 DH 1,313' HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
KNICELY	42C/2 42C/3 42C/6 42C/7	AMAX OF CANADA LTD.	AU,AG,PB AN,CU,NI	DONATED	4 DH 1,313' HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
LEESON	42D/5	SHUNOCK, M., JMS MINE CONTRACTING LTD.	AU	ASSES	TR, GEOL, ASSAYS (AU)	1987	2.9702	WT-LEESON-1
LEESON	42D/5	CONIAGAS MINES LTD.	AU	OMEP	10 DH 6,915', TR, STRIP, 114 PERCUSSION DH, ASSAYS (AU)	1984	63.4588	WT-LEESON-2
LEESON	42D/5	NORTH GOLD FIELD RES LTD.	AU	ASSES	1 DH 327'	1986	DD.25	WT-LEESON-3
LEESON	42D/5	CANREOS MINERALS LTD., KIDD CREEK MINES LTD.	AU	OMEP	BULK SMPL (AU), 13 DH 5,041'	1984-85	63.4607	WT-BRACKIN-4
LEGARDE	42C/3	AMAX OF CANADA LTD.	AU,AG,PB, ZN,CU,NI	DONATED	4 DH 1,313', HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
LENDRUM	42C/2SW 41N/15NW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	MAG	1987	2.9900	WP-BAILLO-QUET-2
LENDRUM	42C/2SW 41N/15NW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU,AS,AG,CU,MO, PB,ZN) GEOCHEM (WR)	1987	2.9837	WP-CHABANEL -2
LENDRUM	42C/2SW 41N/15NW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU,AG,CU,ZN, AS) GEOCHEM (WR)	1986	2.6928	WP-McMURRAY -2
LIPTON	42C/15 42C/16 42F/1 42F/2	RIVER OAKS GOLD RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10254	WT-HAWKINS-1
LIZAR	42C/15 42C/16	RIVER OAKS GOLD RES LTD.	AU	ASSES	AIR MAG, EM	1987	2.10254	WT-HAWKINS-1
MACASKILL	42C/2 42C/3	AMAX OF CANADA LTD.	AU,AG,PB, ZN,CU,NI	DONATED	4 DH 1,313' HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
MARSH	42B/4 42B/5	EBONY GOLD CORP.	AU	ASSES	AIR MAG, EM	1987	2.10257	WP-MARSH-1
MEATH	42C/8NE, SE	CONQUEST YELLOWKNIFE RES LTD.	AU	OMEP	GND MAG & EM	1986	63.4644	WP-STOVER-1
MENZIES	42C/2NW, SW	AMAX OF CANADA LTD.	AU,AG,PB, ZN, CU,NI	DONATED	4 DH 1,313' HEM, VLF, MAG	1979	PENDING	WP-KILLINS-1
MICHIPICOTEN ISLAND	42C/12NW	NEARCTIC RESOURCES INC.	AG	OMEP	GND MAG, EM	1984	63.4582	WP-41N/12NW-1
MISHIBISHU LAKE	42C/03SW	MACMILLAN ENERGY CORP. LTD., GRANGES EXPLORATION LTD.	AU	ASSES	8 DH 698.59M	1986	DD.18	WP-MISHI-BISHU-3

TABLE 8.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
MISHIBISHU LAKE	42C/03SW	GRANGES EXPLORATION LTD.	AU	ASSES	EXPENDITURES	1986	2.9636	WP-MISHI-BISHU-1
MISHIBISHU LAKE	42C/03SW	MUSCOCHO EXPLORATIONS LTD.	AU	ASSES	SOIL GEOCHEM (AU) GND EM	1986	2.9733	WP-MISHI-BISHU-2
MISHIBISHU LAKE	42C/03SW	MACMILLAN ENERGY CORP LTD.	AU	ASSES	22 DH 10,507'	1986	DD.19	WP-MISHI-BISHU-4
MISHIBISHU LAKE	42C/03SW	WASABI RESOURCES LTD.	AU	ASSES	4DH 891'	1986	DD.20	WP-MISHI-BISHU-5
MISHIBUSHU LAKE	42C/03SW	MUSCOCHO EXPLORATION LTD.	AU	ASSES	1 DH 702'	1986	DD.21	WP-MISHI-BISHU-6
MISHIBISHU LAKE	42C/03SW	GRANGES EXPLORATION LTD.	AU	ASSESS	15 DH 1018M	1986	DD.22	WP-MISHI-BISHU-7
MISHIBISHU LAKE	42C/03SW	WESTFIELD MINERALS LTD.	AU	OMEP	GEOL, HUMUS GEOCHEM (AU), TR, PROS, 47 DH 22,413'	1984	63.4586	WP-MISHI-BISHU-8
MISHIBISHU LAKE	42C/03SW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, PROS, GEOCHEM (SOIL) (AU)	1987	2.10277	WP-PT. ISACOR-2
MUSQUASH	42C/2S, W	AMAX OF CANADA LTD.	AU,AG,PB ZN,CU,NI	DONATED	4 DH 1,313' HEM, VLF, MAG	1979	PENDING	WP-KILLINS -1
McMURRAY	42C/2 41N/15W	CAVIAR RESOURCES LTD.	AU	ASSES	GEOL, PROS	1986	2.9300	WP-McMURRAY -1
McMURRAY	42C/2S 41N/15 W	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, ASSAYS (AU,AG,CU,ZN AS), GEOCHEM (WR)	1986	2.6928	WP-McMURRAY -2
McMURRAY	42C/2S 41N/15W	CITADEL GOLD MINES INC.	AU	ASSES	AIR MAG, EM, RES	1986	2.9674	WP-McMURRAY -3
McMURRAY	42C/2S 41N/15W	RIORDAN, E.	AU	ASSES	ASSAYS (AU,AG, WR)	1987	2.10296	WP-McMURRAY -4
NAVEAU	41N/15	MONK GOLD & RES. LTD.	AU	OMEP	21 DH 4336M, ASSAYS (AU), TR, UG EXPLOR., GND MAG, EM	1986	OMEP	WP-RABAZO-2
PILOT HARBOUR NE	41N/13NE	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, PROSP, GEOCHEM (SOIL) (AU)	1987	2.10277	WP-POINT ISACOR-2
POINT ISACOR	41N/14NW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	SOIL GEOCHEM (AU), ASSAYS (AU,AG,AS,CU, ZN), GEOL	1987	2.9735	WP-POINT ISACOR-1
POINT ISACOR	41N/14NW	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GEOL, PROSP, GEOCHEM (SOIL) (AU)	1987	2.10277	WP-POING ISACOR-2
PUKASKWA RIVER	42C/04NE	CAPTAIN CONSOLIDATED RES LTD., KOALA RES LTD.	AU	ASSES	GND EM, PROS, SOIL GEOCHEM (AU), ASSAYS	1986	2.9668	WP-PUKASKWA RIVER-1
PUKASKWA RIVER	42C/04NE	CAPTAIN CONSOLIDATED RES LTD.	AU	ASSES	7 DH 1,789'	1986	DD.11	WP-PUKASKWA RIVER-2
RABAZO	41N/15	SCIMITAR SYSTEMS INC.	AU	ASSES	1 DH 393'	1987	DD.25	WP-RABAZO-1
RABAZO	41N/15	MONK GOLD & RES LTD.	AU	OMEP	21 DH 4336M, ASSAYS (AU), TR, UG EXPLOR., GND MAG, EM	1986	OMEP	WP-RABAZO-2
RABAZO	41N/15	FUNK, H.	AU	ASSES	GND MAG, EM	1987	2.10448	WP-RABAZO-3
RABAZO	41N/15	MORI, R.	AU	ASSES	BASAL TILL SURVEY	1987	2.10490	WP-RABAZO-4
RENNIE	42B/5 42C/8	CONQUEST YELLOWKNIFE RESOURCES LTD.	AU	ASSES	3 DH 1,385'	1987	DD.22	WP-RENNIE-1
RENNIE	42C/5 42C/8	CONQUEST YELLOWKNIFE RESOURCES LTD.	AU	OMEP	GND MAG, EM	1986	63.4644	WP-STOVER-1
RENNIE	42C/5 42C/8	ROYEX GOLD MINING CORP.	AU	ASSES	26 DH 11,960', GND MAG, EM, IP, RES, SOIL GEOCHEM (AU,AG,PB, CU,MO,ZN) GEOL, TR, ASSAYS (AU), GEOCHEM (WR)	1986	2.10127	WP-RENNIE-2

TABLE 8.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
RIGGS	42C/8S	MUSCOCHO EXPLORATION LTD.	AU	ASSES	GEOL, PROS	1986	2.9891	WP-RIGGS-1
RIGGS	42C/8S	MUSCOCHO EXPLORATION LTD.	AU	ASSES	GEOL, PROS, ASSAYS (AU)	1986	2.9892	WP-RIGGS-2
RIGGS	42C/8S	LOYDEX RESOURCES INC.	AU	ASSES	GND MAG, EM	1987	2.9943	WP-RIGGS-3
RIGGS	42C/8S	MATTAGAMI LAKE EXPLORATION LTD.	AU	ASSES	AIR MAG	1987	2.9964	WP-RIGGS-4
RIGGS	42C/8S	CONQUEST YELLOW-KNIFE RES LTD.	AU	ASSES	SOIL GEOCHEM	1987	2.10222	WP-RIGGS-5
RIGGS	42C/8S	SLACK, J.	AU	ASSES	SOIL GEOCHEM	1987	2.10227	WP-RIGGS-6
RIGGS	42C/8S	COMINCO LTD.	AU	ASSES	GND MAG, EM	1987	2.10260	WP-RIGGS-7
RIGGS	42C/8S	LOYDEX RES. INC.	AU	ASSES	GND MAG, EM	1987	2.9961	WP-RIGGS-8
RIGGS	42C/8S	COMINCO LTD.	AU	ASSES	GND MAG, EM	1987	2.10259	WP-RIGGS-9
RIGGS	42C/8S	NORANDA EXPLORATION CO. LTD.	AU	ASSES	GND MAG, EM	1987	2.10418	WP-RIGGS-10
ST. GERMAIN	42C/3S	GRANGES EXPLORATION LTD.	AU,AG	ASSES	9 DH 841.5M	1986	DD.11	WP-ST. GERMAIN-1
STOVER	42C/8SW 42B/5SW	CONQUEST YELLOWKNIFE RES LTD.	AU	OMEP	GND MAG, EM	1986	63.4644	WP-STOVER-1
WEST	42C/8SE	G. WINTER, I. WINTER	AU	ASSES	GND MAG, SOIL GEOCHEM (AU,CU)	1986	2.9479	WP-WEST-1
WEST	42C/8SE	CONQUEST YELLOWKNIFE RES LTD.	AU	ASSES	3 DH 1,822'	1987	DD.17	WP-WEST-3
WEST	42C/8SE	FIRST GENERAL MINE MANAGEMENT & GOLD	AU	ASSES	INVOICES FOR ASSAYS	1987	2.9836	WP-WEST-2

(granodiorite or quartz porphyry) and mafic metavolcanics.

RENABIE–DOG LAKE AREA

Canreos Minerals (1980) Limited began a program of geological mapping, trenching, and diamond drilling (25 000 feet) in October, in order to test other occurrences lying within the 8 km long, 'Braminco Shear' which hosts the '21-vein' (reserves of 80 000 tons at 0.15 ounce gold per ton). The setting of gold mineralization is very similar to that at the Renabie Mine, consisting of gold associated with pyritiferous quartz veins and pods which are contained within zones of sheared granodiorite/trondhjemite (quartz-sericite schists).

Conquest Yellowknife Resources Limited carried out a diamond drilling program north of the Renabie Mine. They intersected significant gold mineralization in a north-trending shear zone (11 feet grading 0.108 ounce gold per ton).

Ateba Mines Incorporated and Chutine Resources Limited began prospecting, stripping, and mapping four gold-bearing quartz veins in central Stover Township. The veins occur in sheared quartz monzonite, near the northern contact of the Ruby Lake Stock with mafic metavolcanics. A diamond-drill program is planned for 1988.

MISHIBISHU LAKE AREA

Muscocho Explorations Limited continued underground exploration of the Maganacon Gold Deposit, completing a total of 4200 feet of decline ramp along with the development of four levels to a depth of 550 feet below surface. Three raises were completed from the 1250- (elevation 250 feet below surface) to the 1350-foot level following the main ore zone (vein). Within the raises, the main ore zone averaged about 5.5 feet in width with an average grade of 1.01 ounces gold per ton. The deepest surface drilling cut 10.6 feet grading 0.37 ounce gold per ton at a depth of 1200 feet below surface. Underground development found that assays were 40 percent higher than those determined from diamond-drill core, resulting in the determination of proven and probable ore reserves of 443 913 tons grading 0.4 ounce gold per ton with a 0.2 ounce gold per ton cut-off, or 1.1 million tons grading 0.24 ounce gold per ton with a 0.1 cut-off. The majority of these reserves lie less than 500 feet below surface. Bulk testing of the Magnacon ore is planned in 1988 at the 400 ton per day Magino test mill. A production decision is expected by the Spring of 1988.

The Magnacon Deposit represents only one-third of the total length of the mineralization indicated by earlier surface drilling; in order to examine the west-northwest extension of the main ore zone, a decline ramp was driven from the 1250-foot level on the main spiral ramp from which drifting and diamond drilling will progress in 1988. A total of 35 000 feet of underground drilling and 65 000 feet of surface drilling were completed in 1987. Surface exploration programs were completed in the Katzenbach Lake area and southwest of Mishibishu Lake. Grab samples from surface prospecting about 1 km east of the Magnacon Deposit assayed in the range of 0.11 to 0.16 ounce gold per ton.

At the Magnacon Deposit, gold mineralization is associated with galena, arsenopyrite, pyrite, chalcopyrite, and molybdenite, which occur as irregular veinlets and disseminations within massive grey-white quartz veins. The veins range from less than

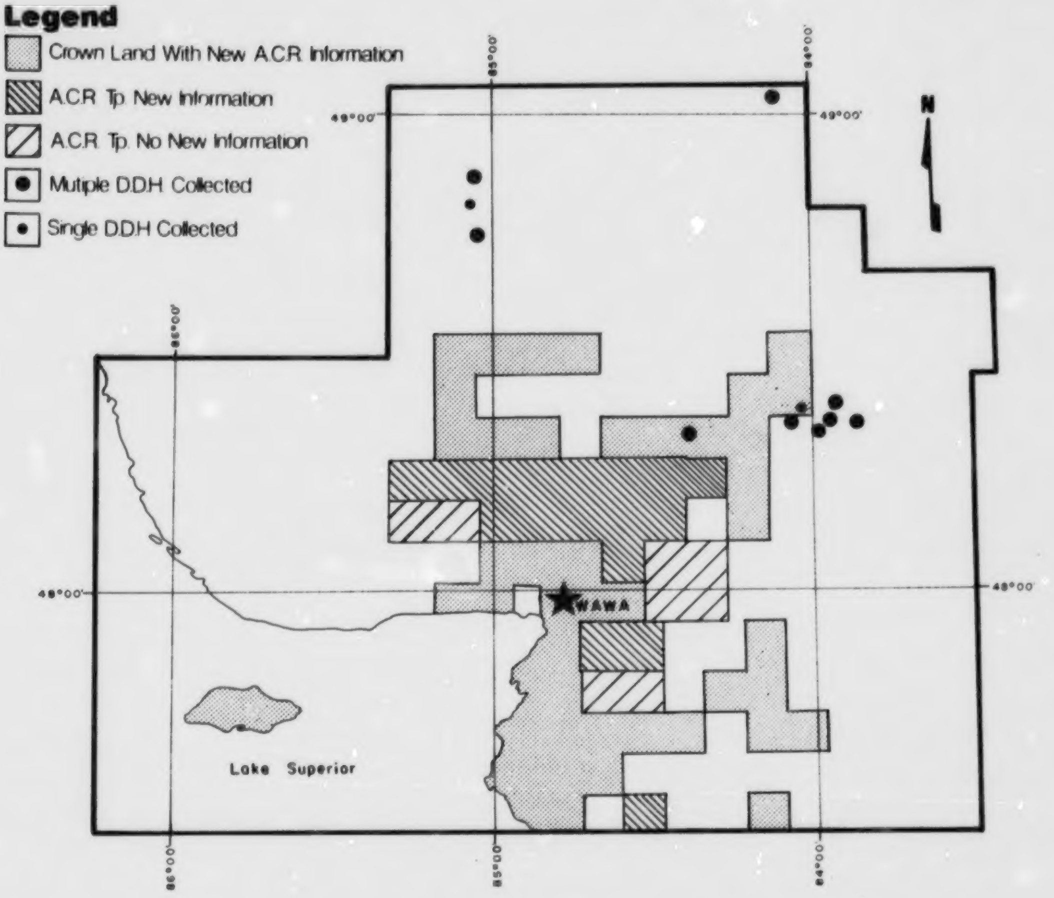
Legend
▨ Crown Land With New A.C.R. Information
▧ A.C.R. Tp. New Information
▨ A.C.R. Tp. No New Information
● Multiple D.D.H. Collected
• Single D.D.H. Collected
49°00'
49°00'
48°00'
48°00'
86°00'
85°00'
84°00'
86°00'
85°00'
84°00'
N
WAWA
Lake Superior

***Figure 8.7.** Location map of Algoma Central Railway files consolidated during 1987; diamond-drill core collected during 1987.*

1 m up to 2 m wide and are hosted within quartz-sericite schists which form part of the Mishibishu Lake Deformation Zone (Heather 1986).

Granges Exploration Limited, in joint venture with MacMillan Energy Corporation, continued drilling the on-strike extension of the deformation zone which hosts the Magnacon Gold Deposit (Muscocho Explorations Limited). Between August 1986, and August 1987, a total of 185 drillholes were completed on their property, totaling 29 900 m. Throughout the year, they encountered sporadic gold mineralization in drill core until the Fall of 1987 when they began making significant intersections (i.e. 18 feet grading 0.328 ounce gold per ton). As of November 1987, an estimated reserve of 600 000 tons grading 0.19 ounce gold per ton had been outlined in the Main Zone lying between 400 and 1137 feet below surface. The mineralized zone is about 100 m long by 10 m wide.

In 1988, Granges Exploration Limited plans to drive a decline to the 250-foot level and complete 10 000 feet of surface drilling on the Main Zone, 15 000 feet of drilling in a mineralized area 1000 m west of the Main Zone, and 10 000 feet of drilling to test other anomalous areas on their property.

Dominion Explorers Incorporated completed a surface exploration program during the summer and is continuing diamond drilling in the Scuzzy Little Lake area. Their property is situated about 8 km west of the Magnacon Deposit in the Mishibishu Lake Deformation Zone. Drill intersections of 6 feet grading up to 0.2 ounce gold per ton have been encountered.

Harold Jones and Associates Limited completed geological, geophysical, and geochemical surveys on their property located southwest of Dominion Explorers Incorporated, following the trend of the Mishibishu Lake Deformation Zone. Several target areas were delineated for further work.

Tundra Gold Mines Limited completed airborne geophysics, prospecting, and geochemical sampling programs in the Dog (University) River and Missing Lake areas southeast and southwest of Mishibishu Lake respectively. A diamond-drilling program began late in the fall on the Dog (University) River properties to test several targets identified during the summer program. The properties lie on what is believed to be the eastern extremity of the Mishibishu

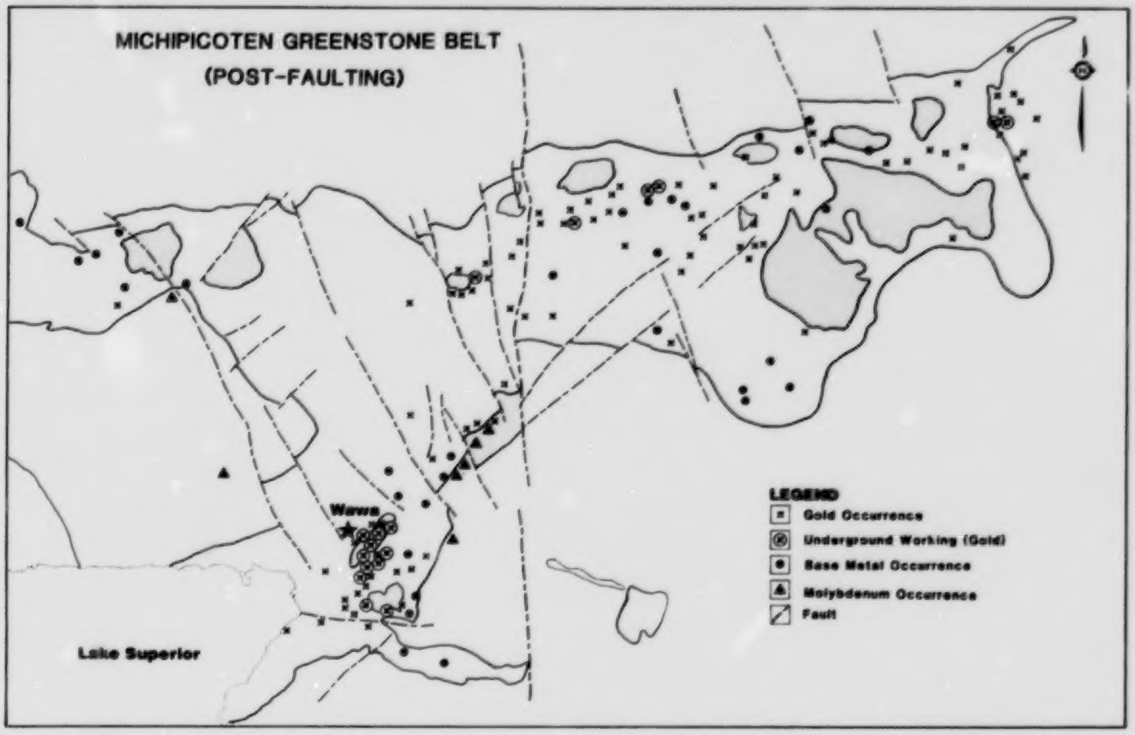

Figure 8.8. *Gold mineralization trends in the Michipicoten Greenstone Belt. Stippled areas are felsic intrusions.*

Lake Deformation Zone. Gold mineralization associated with arsenopyrite occurs in quartz veins parallel to and crosscutting strongly foliated quartz-sericite-chlorite schists.

Noranda Exploration Company Limited, in joint venture with Central Crude Limited, encountered significant mineralization in surface grab and channel samples from its property in the No Name Lake area, south of Mishibishu Lake. Channel samples returned up to 10.6 feet grading 0.092 ounce gold per ton; grab samples have assayed up to 24 ounces gold per ton. Mineralization appears to be associated with quartz-sericite schists of the Eagle River Deformation Zone (Heather 1986).

RECOMMENDATIONS FOR EXPLORATION

In the Mishibishu Lake area, economic gold mineralization occurs in quartz veins contained within sericite-quartz schists which form part of the Mishibishu Lake Deformation Zone ("MLDZ"; Heather 1986). The MLDZ has a width of up to 2 km, and straddles a major lithologic contact separating metavolcanics to the north from metasedimentary rocks to the south. This environment has many similarities to a 'Timiskaming-type' setting (G. Bennett, Resident Geologist, Ministry of Northern Development and Mines, Sault Ste. Marie, personal communication, 1986). It appears that both the Magnacon and the Granges Exploration Limited deposits occur in an area where north-northeast-trending regional-scale ductile shears intersect the MLDZ (K.B. Heather, Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto, personal communication, 1987). Furthermore, the deposits and other associated occurrences are located within 3 km of the amphibolite-greenschist facies transition near the edge of the greenstone belt. Other areas with a similar combination of geological characteristics should be considered as having excellent gold potential.

In the Wawa–Michipicoten area, the area north of Hawk Junction has not received enough attention. Currently, Reed Lake Exploration Limited and Soocana Exploration Limited are the only companies which have been actively developing gold occurrences on the eastern end of a series of east- and east-northeast-trending shear zones which cut through Chabanel, Esquega, and Corbiere Townships. These shear zones and faults, as well as major lithologic units, are consistently off-set by movement on left-lateral, north- and north-northwest-trending younger faults with up to 5 km strike displacement. Gold occurrences have been documented in these offset blocks, and it is expected that ground follow-up will verify the existence of east- to east-northeast-trending shear zones (Figure 8.8). Interestingly, these inferred shear zones lie in the less accessible areas of Aguonie, Bird, northern Cowie, and Debassige Townships.

In the Goudreau–Lochalsh area, gold mineralization occurs in quartz±carbonate veins and silicified zones related to shear zones or faults. Host lithology and the orientation of the gold-bearing structures is

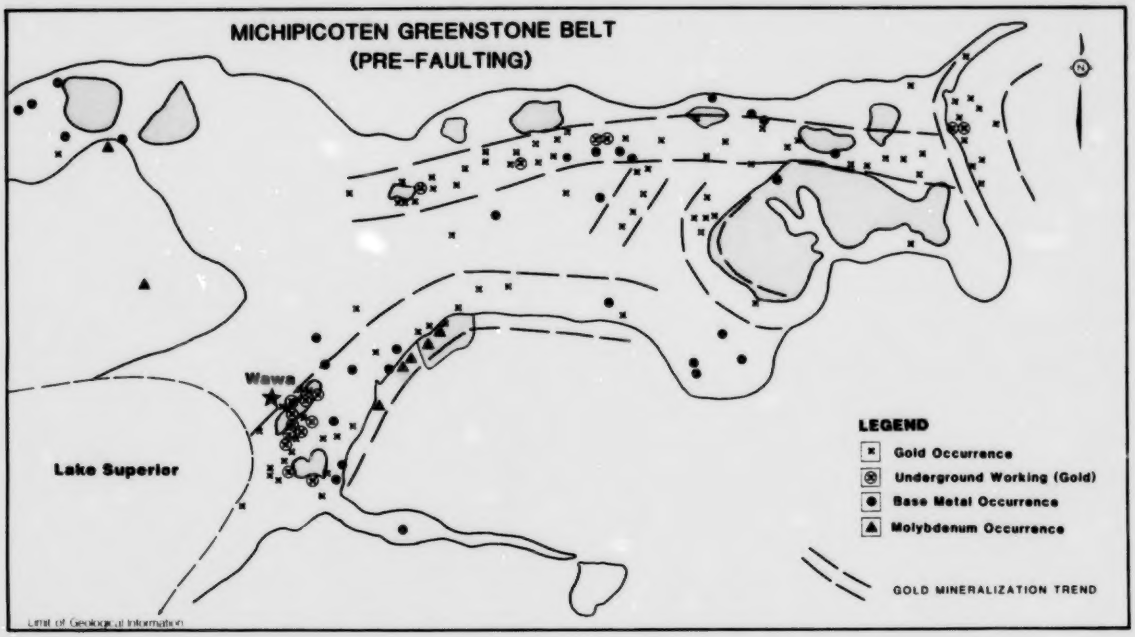
MICHIPICOTEN GREENSTONE BELT
(PRE-FAULTING)
N
Wawa
Lake Superior
LEGEND
× Gold Occurrence
⊗ Underground Working (Gold)
● Base Metal Occurrence
▲ Molybdenum Occurrence
GOLD MINERALIZATION TREND
Limit of Geological Information

Figure 8.8A

variable, but there is a preference for gold occurrences/deposits to occur within the east-northeast-trending Goudreau Lake Deformation Zone ("GLDZ"; Heather and Arias 1987; Arias and Heather 1987). Gold mineralization is also closely associated with felsic intrusive to subvolcanic rocks. There is the strong likelihood that the GLDZ extends past the eastern end of the Goudreau area (Lochalsh) and joins up with the east-trending structures in the Renabie area (Figure 8.8). The area north and northeast of Missinaibi (West and Stover Townships), which is characterized by the presence of two felsic intrusives, partly enveloped around the periphery by gold showings and lying in the strike extension of the GLDZ, has excellent economic gold potential.

The Renabie–Dog Lake area holds as much promise of economic gold potential as any other area in the district. The Renabie Mine to date is the major gold producer in the Wawa area and historically was the largest gold mine in the district. Gold mineralization occurs in large pods (20 by 80 m) of vein quartz hosted within sheared granodiorite and tonalite (quartz-sericite schist). Both the location of the Renabie Deposit and plunge of the ore shoots appear to be controlled by the intersection of the east-trending 'Renabie break' and a northwest-trending shear zone which hosts several gold occurrences ('21 Vein', Canreos Minerals (1980) Limited). Gold occurrences are also strung out parallel to the greenstone-granite contact and within 1 km of the greenstone belt. A similar association occurs in the Dog Lake area where gold occurrences are located around the perimeter of a felsic batholith and within 1 km of the granite-greenstone contact. Gold occurrences are also found within greenstone 'tails' separating felsic plutons, in areas which represent large-scale 'roof-pendants', and just within the perimeter of the felsic plutons.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

The Ontario Mineral Exploration Program provided assistance to 24 exploration companies/prospectors active in the Wawa area. Grants totaled $1.7 million for eligible expenditures of $6.8 million. Following a period of one year confidentiality, company technical reports are available through the Wawa Resident Geologist's Office.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

A total of six geoscience projects were undertaken by the Ontario Geological Survey in the Wawa District (Figure 8.1). These were

1. an airborne geophysical survey of the Michipicoten Greenstone Belt, contracted to DIGHEM (Barlow 1987)
2. an orientation geochemical lake sediment and water survey for gold across the Michipicoten Greenstone Belt in the Goudreau area, conducted by J.A.C. Fortescue (Fortescue and Stahl 1987)
3. a geological survey of the western end of the Mishibishu Lake area, by R.G. Reid (Reid and Reilly 1987)
4. geological surveys in the Michipicoten Greenstone Belt, by R.P. Sage (1987a, 1987b, in press)
5. a geological study of the gold deposits and occurrences in the Goudreau area, by K.B. Heather (Heather and Arias 1987)

6. a structural study of the Goudreau area, by Z.G. Arias (Arias and Heather 1987)

PRECAMBRIAN GEOLOGY SECTION

R.P. Sage completed the geological mapping of the northern portions of Finan and Jacobson Townships, the southeastern corner of Dunphy Township, and most of Lalibert Township. Mapping will continue into Knicely and Killings Townships for the 1988 field season.

R.G. Reid completed the mapping of the Mishibishu Lake Greenstone Belt which was begun in 1985. Results of the three-year mapping program have influenced staking and exploration activity by defining the extent of gold-bearing deformation zones in the area.

K.B. Heather began a gold deposit study in the Goudreau–Lochalsh area which has seen intense exploration activity, the development of two gold deposits (the Magino Deposit, Muscocho Explorations Limited; and the Kremzar Deposit, Canamax Resources Incorporated), and a new gold discovery (Goudreau Lake Zone, Canamax).

Z.G. Arias completed a structural geological study of the Goudreau–Lochalsh area with the purpose of establishing regional structural relationships to gold mineralization. The study complements detailed work on the gold deposits by K.B. Heather.

Results of geological studies by K.B. Heather and Z.G. Arias indicate the presence of a 'deformation corridor' in the Goudreau area trending east-northeast and arcing to an easterly orientation, possibly joining with the east-trending Renabie Mine structures.

GEOPHYSICS/GEOCHEMISTRY SECTION

Airborne electromagnetic and magnetic surveys were flown by DIGHEM over the Michipicoten Greenstone Belt in an effort to provide a complete geoscience database for the area. The results are expected to further stimulate claim staking and mineral exploration (Figure 8.1).

John Fortescue completed a lake sediment and water orientation survey of a north-south swath of the Michipicoten Greenstone Belt in the Goudreau area (Figure 8.1). The purpose of the study is to see if geochemical analysis of lake waters and sediments in the Goudreau area can outline areas of known gold mineralization and thereby be applicable to poorly accessible and little explored areas elsewhere.

GEOSCIENCE DATA CENTRE

The Geoscience Data Centre, in co-operation with the Wawa and Sault Ste. Marie Resident Geologist's Offices, has developed a searchable, easy to use, computer database for Geological Data Inventory Folios (GDIFs). A prototype was displayed at the 1987 Ontario Geological Survey Geoscience Research Seminar in Toronto and the program and database can be viewed at the regional offices.

The Goudreau area was selected for the creation of a digitized geoscience database due to the variety of geoscience information available on the area and the intense exploration/development activity. The purpose of the pilot study is to illustrate a computer-aided methodology for assessing the exploration potential of an area, and provide rapid access to a wide variety of geoscience information.

RESEARCH BY OTHER AGENCIES

ONTARIO CENTRE FOR REMOTE SENSING (OCRS)

The Ontario Centre for Remote Sensing conducted an airborne imaging radar north-south test flight 9 km wide in the Goudreau area. This work, along with the available LANDSAT imagery on the area, provides additional information for an integrated geoscience database.

UNIVERSITY OF MASSACHUSETTS

G.E. McGill, Professor, Department of Geology, continued structural studies in central and northeastern Chabanel Township. This faculty research project began in 1984 as a contribution to the NASA crustal genesis program and has yielded a preliminary tectonic history for this part of the Michipicoten Greenstone Belt. Detailed structural mapping suggests that imbricate thrusting dominated the early deformation history.

C.H. Shrady, University of Massachusetts Ph.D. candidate, is completing a dissertation on part of the above area with additional emphasis on the nature of cleavage, folding, and strain of the sedimentary units. Preliminary conclusions indicate a complex deformational history, with early folding and shearing producing significant shortening and strain. Their recent publications are listed in the references.

UNIVERSITY OF TORONTO

N.J. Callan, M.Sc. candidate, continued detailed mapping of structures and lithologies in the Renabie Mine area to complement and extend the underground and surface mapping completed last year. His work suggests that the trondhjemite/tonalite hosted gold-quartz mineralization of the area is a magmatic product, emplaced in part by hydraulic fracturing within ductile shear zones. Additional field work, petrography, geochemistry, and fluid inclusion studies are planned for 1988.

OTHER RESEARCH PROJECTS

Several independent research projects are in progress as by-products of the OGS mapping program in the Mishibishu Lake area. R.G. Reid is completing a stratigraphic and geochemical study of the volcanic rocks of the area as a M.Sc. thesis at the University of Windsor. R. Kellar, another University of Windsor M.Sc. candidate, is developing a U-Pb geochronology of the Mishibishu Greenstone Belt. P. Blomberg, University of Toronto B.Sc. candidate, is studying the petrography and geochemistry of the granitoids within the Central pluton. C. Drachenberg, B.Sc. candidate at Queen's University, Kingston, is doing a structural study of the Rook Lake deformation zone. Alteration patterns within the Rook Lake deformation zone are being studied by University of Windsor B.Sc. candidate R. Sherman.

In the Wawa area, M. Durose, B.Sc. candidate, Carleton University, Ottawa, is studying the platinum, copper, and nickel mineralization of the Lakemount Property, Esquega Township.

In the Goudreau area, D. Finley is studying the Quaternary geology of central Jacobson Township as a B.Sc. thesis topic at Carleton University, Ottawa. J. Hammar, B.Sc. candidate, Queen's University, Kingston, is studying the Canamax Resources Incorporated-Morrison #1 Gold Occurrence in Finan Township.

ACKNOWLEDGMENTS

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9. Sault Ste. Marie Resident Geologist's Area—1987

G. Bennett[1], E.J. Leahy[2], J. Melisek[3]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[3]Drill Core Library Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

INTRODUCTION

The permanent staff of the Sault Ste. Marie Resident Geologist's Office consists of E.J. Leahy, Staff Geologist, B. Fremlin, Secretary, and G. Bennett, Resident Geologist. During the Summer, Stefanie Schwerdtfeger carried out miscellaneous duties for the Staff Geologist and Resident Geologist, and Jari Paakki assisted the Drill Core Library staff with the drill core collection program. Ms. Schwerdtfeger and Mr. Paakki were employed under the Experience '87 Program.

The Drill Core Library program continued under the immediate direction of J.P. Donald until October 1987, when Mr. Donald accepted a secondment with the Information Technology Branch of the Ministry of Northern Development and Mines. Since November 1987, J. Melisek has acted as Drill Core Library Geologist. D. Messenger continued as assistant to the Drill Core Library Geologist.

A report of the activities of the Drill Core Library staff is included in this report.

In January 1987, the Ministry of Northern Development and Mines, Mines and Minerals Division, opened a Resident Geologist's Office at Wawa with D.J.J. Tortosa as Resident Geologist. The boundaries of the Sault Ste. Marie Resident Geologist's Office are shown on Figure 9.1.

RESIDENT GEOLOGIST'S OFFICE STAFF ACTIVITIES

A great deal of the Resident Geologist's time was divided between administrative matters and committee work. The Resident Geologist was a member of a working group of the Mineral Resources subcommittee, and is a member of the Information Technology Subcommittee. He also provided proposals and background information regarding Geological Data Inventory Folios at the request of other subcommittees.

Much time was also spent responding to Ministry, industry and public inquiries which remained at a relatively high level in 1987, in spite of the reduction of the Resident Geologist's district and the proportionately greater reduction in mineral exploration activity with respect to previous years.

The Resident Geologist led a field trip through the Sault Ste. Marie–Mamainse area and assisted with field trips in the Wawa area during the May meeting of the Institute on Lake Superior Geology held in Wawa. Presentations on geological subjects were given to the Sault Ste. Marie Naturalist Society and to Junior Rangers at Mississagi Provincial Park.

During 1987, the Resident Geologist made five visits to active mines and twelve visits to mineral occurrences under current exploration.

In the Summer and Fall of 1987, six days were spent carrying out field investigations in Fenwick and Havilland Townships in an attempt to determine the stratigraphic relationship of an occurrence of dolostone unique to the area. A brief preliminary report of these investigations is given in this report.

A few weeks in January 1987, were spent on the continuation of a study of the lower Huronian stratigraphy and Huronian volcanic rocks between Elliot Lake and Sault Ste. Marie.

During the first quarter of 1987, the Staff Geologist supervised the Geological Data Inventory Folio compilations being carried out by L. Ashick, T. Howson, J. Melisek, and W. Wing; this project coming to an end in March. This was followed by extracting assessment files, reports, maps, airphotos, etc. to be forwarded to Wawa for the establishment of the new Resident Geologist's Office there. Originals and copies of Geological Data Inventory Folios for 61 townships or National Topographic System (NTS) areas covering nearly the whole of the Mishibishu–Michipicoten greenstone areas were also sent to Wawa. The writer visited properties in Gapp, Chesley, and Tarentorus Townships and with the assistance of summer student employee, Stefanie Schwerdtfeger, located and measured a few additional workings of the old Bruce Mines. Representatives of the Lands Section of the Ministry of Natural Resources and the Mining Health and Safety Branch of the Ministry of Labor were taken on a tour of the old mine workings at the town of Bruce Mines to determine if they constituted a mine hazard.

The summer student assisted in the preparation of new index maps for the area enclosed in the revised Sault Ste. Marie Resident Geologist's Office district boundaries, assisted in the preparation of a set of large "hands-on" rock and mineral specimens for the Sault Ste. Marie Museum's new "Discovery" Gallery, coloured recent preliminary geological maps, and helped in other work as required. The Staff Geologist indexed and added to the files of technical articles and spent a great deal of his time assisting prospectors, industry people, and the general public in their visits to the office.

CLAIM STAKING ACTIVITY

Between January 1, and November 30, 1987, 621 mining claims were recorded in the Sault Ste. Marie Resident Geologist's district. Most of the claim staking activity took place in the western portion of the Batchawana Greenstone Belt.

MINING ACTIVITY

Denison Mines Limited continued production of uranium oxide from its mine and mill at Elliot Lake, where bacterial leach recovery has been successfully carried out in addition to conventional mining and recovery methods.

In early 1987, Denison Mines Limited purchased the mining leases of Canuc Resources Incorporated

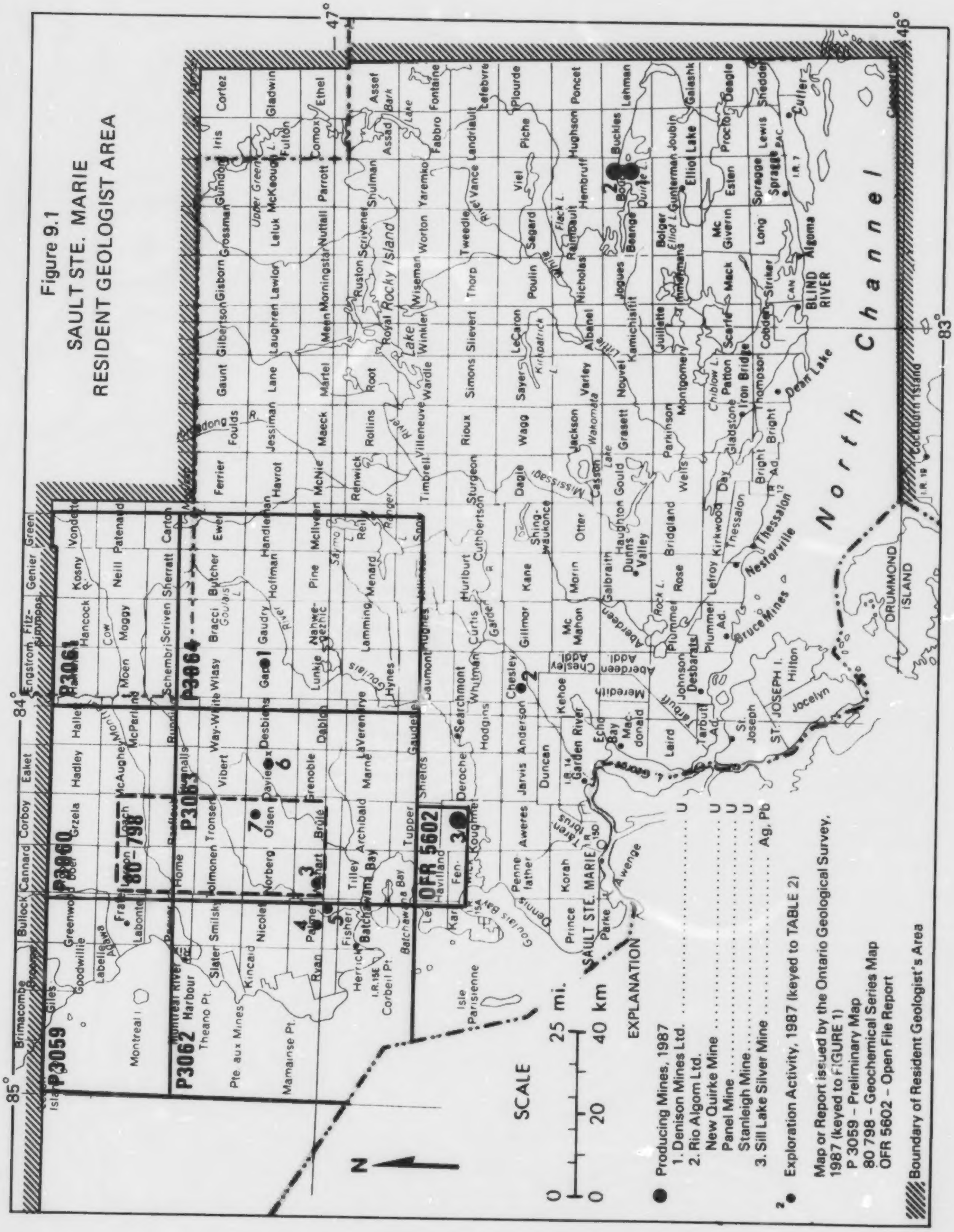


Figure 9.1
SAULT STE. MARIE
RESIDENT GEOLOGIST AREA

85°
84°
83°
47°
46°
N
SCALE
0 20 25 mi.
0 40 km
P3059
P3060
P3061
P3062
P3063
P3064
80 798
OFR 5602
SAULT STE. MARIE
BLIND RIVER
North Channel
DRUMMOND ISLAND
ST. JOSEPH I.
Cockburn Island
Montreal I.
Isle Parisienne
Batchawana Bay
Goulais Bay
Mamainse Pt.
Pte. aux Mines
Theano Pt.
Montreal River Harbour
Corbeil Pt.
Echo Bay
Bruce Mines
Thessalon
Nestorville
Iron Bridge
Dean Lake
Desbarats
Searchmont
Mississagi
Rocky Island Lake
Quirke L.
Elliot Lake
Cutler
Algoma
1
2
3
4
5
6
7

EXPLANATION

- ● Producing Mines, 1987
  - 1. Denison Mines Ltd. .... U
  - 2. Rio Algom Ltd.
    - New Quirke Mine .... U
    - Panel Mine .... U
    - Stanleigh Mine .... U
  - 3. Sill Lake Silver Mine .... Ag, Pb
- ² ● Exploration Activity, 1987 (keyed to TABLE 2)
- Map or Report issued by the Ontario Geological Survey, 1987 (keyed to FIGURE 1)
  - P 3059 – Preliminary Map
  - 80 798 – Geochemical Series Map
  - OFR 5602 – Open File Report
- ▨ Boundary of Resident Geologist's Area

on the south boundary of Denison's Elliot Lake property. Development work is under way to gain access to the former Canuc Resources Incorporated uranium deposits.

The yttrium recovery plant, a joint venture of Denison Mines Limited, Shin-Etsu Chemical Company, Molycorp Incorporated, and Mitsui Company continued production at Elliot Lake through 1987. Most of the production of this 150 tons per year mill will go to Japanese manufacturers of electronic components.

The recent reports of the discovery of relatively high temperature superconducters employing yttrium ceramic compounds is of special interest in view of the extensive mineral inventory of yttrium in the Elliot Lake uranium deposits.

Rio Algom Limited continued operation of the Quirke, Stanleigh, and Panel Mines in the Elliot Lake area. Rio Algom is planning the installation of natural gas as a cost-cutting measure (Sault Star, January 26, 1987).

The uranium mining activity of both Denison Mines Limited and Rio Algom Mines Limited was interrupted by a nineteen-day strike by the United Steelworkers of America during the Summer of 1987.

In the Fall of 1987, Sill Lake Silver Mine Limited resumed mining and milling a vein-type lead-silver deposit in Vankoughnet Township. In 1987, the original 100 tons per day mill capacity was increased to about 150 tons per day, and underground workings were extended an additional 300 feet to the east. Concentration of the argentiferous galena is by a combination of spirals and flotation cells. Don Dolan, Mine Manager, reports that about 200 tons of concentrate, averaging over 100 ounces silver per ton and between 70 and 82 percent lead were shipped during 1987.

EXPLORATION ACTIVITY

Mineral exploration during 1987, in the Sault Ste. Marie Resident Geologist's district was focused on gold, with most of the activity taking place in the western part of the Batchawana metavolanic-metasedimentary belt. The significant increase in the gold price is, of course, the main reason for the maintenance of gold exploration levels. In addition, the recent almost doubling of the copper price has spurred a renewed interest in base metal properties.

Table 9.2 summarizes the exploration activity in the Sault Ste. Marie Resident Geologist's District during 1987.

Rampart Resources Limited holds an option on 244 unsurveyed claims in Olsen and southern Tronsen Townships in the Batchawana area about 45 miles north of Sault Ste. Marie. In January 1987, Rampart Resources Limited completed a 5000-foot(1500 m) drilling program in Olsen Township in the Batchawana area.

Massive Resources Limited (formerly Massive Energy Corporation) holds a block of 285 claims in Desbiens, Davieaux, and Vibert Townships. Representatives of Massive Resources Limited report that during the Winter of 1987, Massive Energy carried out a 5000- foot(1500 m) drilling program in Desbiens Township. During the Summer and Fall additional stripping, trenching, and sampling were carried out. This work was concentrated on the ""Hammer-Bridge" and "Dejur" showings in Davieaux Township.

Locator Explorations Limited optioned an 87-claim group in Palmer and Ryan Townships from local prospectors in the Summer of 1987. The property is reported to contain several gold occurrences along an approximately north-south-trending fault in mafic metavolcanics. Pyrite and chalcopyrite are associated minerals. In the Fall of 1987, Locator carried out preliminary geological mapping, sampling, and power stripping on the property. Company representatives report that a 3000-foot (1000 m) diamond-drilling program is planned for early 1988.

In the Spring of 1987, two Sault Ste. Marie prospectors, Y. Desjardins and D. Fleming discovered a previously unknown gold occurrence in west-central Wishart Township. The decision to prospect that particular area was made on the basis of lineaments on published geological maps of the Ontario Geological Survey. Additional prospecting, trenching, and ground magnetic surveys were carried out following an agreement with Loydex Resources Incorporated. Gold is reported to occur in association with northeast-striking, pyrite-bearing quartz-carbonate veins within sheared and altered mafic metavolanics and metawacke (L.J. Nelson, President, Loydex Resources Incorporated, personal communication, November, 1987).

In November 1987, the 120-claim property was optioned by Lacana Mining Corporation. Additional staking, line cutting, prospecting, trenching, and sampling is being carried out at this time (December 1987).

During the Summer of 1987, local prospectors J. Haugeneder and W. Richards carried out stripping, trenching and sampling on a previously undocumented gold-silver showing on a group of seven unpatented claims in west-central Chesley Township, about 40 km northeast of Sault Ste. Marie. Gold occurs mainly in a vertical unit of white quartz and pale cherty material about 8 inches (20 cm) thick, striking about 060°. For at least three feet on both sides of the vein the surrounding rocks are dark and coarse-grained, chloritized, brecciated granitic rocks. The country rocks are tonalitic gneisses and younger quartz monzonite. Grab samples from the vein have assayed up to 0.102 ounce gold per ton (3.5 g/t) and 2.4 ounces silver per ton (82.3 g/t). The prospectors report that a piece of float found near this showing assayed 0.306 ounce gold per ton (4.91 g/t). There are three previously explored copper-gold showings on the above seven-claim group.

Sault Ste. Marie prospectors F. Costa and G. Konig hold a group of 26 unpatented claims in the Haynes Lake area of Gapp Township. Prospecting, stripping, trenching, and sampling have been carried out on gold and base metal showings on this property during the Summer of 1987. Seams of sphalerite and galena occur in metachert-carbonate iron formation at at least two locations on the property. G. Konig reports obtaining interesting gold values from grab samples taken from two previously undocumented

TABLE 9.1 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

AIREM - Airborne Electromagnetic Survey
AMAG - Airborne Magnetometer
ASSES. - Assessment Work
AU - Gold
DD - Diamond Drilling
DH - Drillhole
EM - Electromagnetic Survey
GEOCHEM - Geochemical Survey
GEOL - Geology

GMAG - Ground Magnetometer
GRNDEM - Ground Electromagnetic
IP - Induced Polarization Survey
OMEP - Ontario Mineral Exploration Program
R+S - Rock and Soil
RPT - Report
SP - Self Potential Survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ALBANEL	41J/11SE	ROY, A	AU,AG,ZN, CU,PB	ASSES.	GRNDEM,ASSAYS, GEOL	1986	ALBANEL 0049-A1	
DAVIEAUX	41N/01NE	MASSIVE ENERGY SADOWSKI, J	AU	ASSES.	AMAG,EM	1986	DAVIEAUX 0016	
DUNCAN	41K/09NE	WATSON LAKE MS LONGBOW EXPL	AU	ASSES.	MULTI RPT,IP, GMAG+EM	1984	DUNCAN 0013	
GAPP	41O/04NW	NORANDA EXPL	AU	ASSES.	DH	1986	GAPP 0023-A1	
GLADSTONE	41J/06SW	IDZIAK, B R	AU	ASSES.	SP	1985	GLADSTONE 0015-A1	
GLADSTONE	41J/06SW	IDZIAK, B R	AU	ASSES.	SP	1985	GLADSTONE 0015-B1	
GLADSTONE	41J/06SW	IDZIAK, B R	AU	ASSES.	GMAG	1986	GLADSTONE 0015-C1	
LUNKIE	41O/04SW	NORANDA EXPL	AU	ASSES.	DH	1986	LUNKIE 0012-A1	
NICOLET	41N/02SE	JONPOL EXPL	AU	ASSES.	MULTI RPT,AMAG+ EM,GEOL	1985	NICOLET 0041	
NORBERG	41N/01NW	JONPOL EXPL	AU	ASSES.	MULTI RPT,AMAG+ EM,GEOL	1985	NICOLET 0041	
OLSEN	41N/01SW	ONTEX RES MID-NORTH ENG	AU	ASSES.	GMAG+EM,GEOL, R+S,GEOCHEM	1985	OLSEN 0017	
OLSEN	41N/01SW	MASSIVE ENERGY SADOWSKI, J	AU	ASSES.	AMAG+EM	1986	DAVIEAUX 0016	
PALMER	41N/02SE	RAMPART RES	AU,CO,CU, AG	ASSES.	AMAG+EM,ASSAYS	1986	PALMER 0035-A1	
PALMER	41N/02SE	RUPERT, R J	AU,CP,CU, CO	ASSES.	GEM+RAD,ASSAYS	1986	PALMER 0035-B1	
RUNNALLS	41N/08SE	GRANGES EXPL DRYDEN RES	CU,PB,ZN, AG,AS,AU	ASSES.	DD,ROCK GEOCHEM	1986	RUNNALLS 0021	
RUNNALLS	41N/08SE	GRANGES EXPL DRYDEN RES	AU	ASSES.	GRNDEM	1986	RUNNALLS 0022	

TABLE 9.1 ASSESSMENT WORK RECEIVED BUT NOT IMPLEMENTED INTO SYSTEM

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ABERDEEN	41J/05	BRINK MNG & RES	AU	ASSES.	REPORT	1986	ABERDEEN	
CASSON	41J/11SW	TOMASINI, A		ASSES.	VLF-EM	1987	CASSON	
DAVIEAUX	41N/01NE	MASSIVE ENER.	AU	ASSES.	AMAG,AIREM, GEOL	1983-86	DAVIEAUX	
DESBIENS	41N/01NE	SANTA MARIA RES	AU	OMEP	EM,GEOL	1985	DESBIENS	
GLADSTONE	41J/06SW	IDZIAK, B		ASSES.	MAG	1986	GLADSTONE	
MOGGY	41O/05SW	NORANDA EXP	AU	ASSES.	GMAG+EM	1986	MOGGY	
NEILL	41O/05SE	NORANDA EXP	AU	ASSES.	GEOL	1987	NEILL	
OLSEN	41N/01SW	BUSH PILOT CORP. MASTER RES ONTEX RES RAMPART RES	AU	ASSES.	GEOL,EM,DD	1986	OLSEN	
PALMER	41N/02SE	600278 ONT INC.	AU	ASSES.	DD	1984	PALMER	
RUNNALLS	41N/08SE	DRYDEN RES	AU	ASSES.	DD	1986	RUNNALLS	
SHEDDEN	41J/08SW	ENERTEX	CU	OMEP	MAGEM,GEOL,RAD	1985	SHEDDEN	

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 9.2

Number on Figure	Individual or Company	Activity
1.	COSTA, F./KONIG G.	STRIPPING, TRENCHING, SAMPLING, GAPP TWP.
2.	HAUGENEDER. I./RICHARDS W.	STRIPPING, TRENCHING, SAMPLING, CHESLEY TWP.
3.	LACANA MINING CORP.	STRIPPING, TRENCHING, GEOPHYSICAL SURVEY, WISHART TWP.
4.	LOCATOR EXPLORATIONS LTD.	STRIPPING, GEOLOGICAL MAPPING, PALMER TWP.
5.	MARADONA RESOURCES INC.	AIRBORNE GEOPHYSICAL SURVEY, PALMER TWP.
6.	MASSIVE RESOURCES LTD.	DRILLING, TRENCHING, SAMPLING, DESBIENS TWP.
7.	RAMPART RESOURCES LTD.	DRILLING, OLSEN TWP.

occurrences. The general geology of the area is described by Grunsky (1980).

SAULT STE. MARIE DRILL CORE LIBRARY

The Sault Ste. Marie Drill Core Library serves all of the Sault Ste. Marie Mining Division which includes the areas served by the offices of both the Sault Ste. Marie and Wawa Resident Geologist's Offices.

During 1987, diamond-drill core totaling 11 000 m from a total of 204 drill sites was donated to the Library. A total of 3700 m (12 170 feet) were recovered from the Wawa Resident Geologist's district while 7300 m (2400 feet) came from the Sault Ste. Marie Resident Geologist's District. The inventory of the Sault Ste. Marie Drill Core Library was increased to 70 000 m (230 000 feet).

The changes in the Mining Division boundaries in 1987, necessitated the redistribution of drill core with the Thunder Bay and Timmins Drill Core Libraries.

J. Donald's activities prior to his departure included the development of a computer program for the Geological Data Inventory Folio, in addition to his regular duties as Core Library Geologist.

Major projects for 1987 included the acquisition of Bush Pilot Corporation drill core from the Batchawana area. Bush Pilot's contribution of 1100 boxes was moved via the Algoma Central Railway. In January, Mascot Gold Mines Limited donated core from the Dayohessarah Lake area. Drill core from ten holes drilled by the Keltic Mining Corporation Limited were transferred to the Ministry of Natural Resources dock on Kabinakagami Lake for retrieval in the Spring of 1988. Core drilled by Sutherland and Associates in 1965, was found to be in good condition and was retrieved by helicopter from Schembri Township.

An inventory catalogue of drill core is available upon request at the Sault Ste. Marie Resident Geologist's Office.

DOLOSTONE OCCURRENCE, GOULAIS BAY AREA

Ontario Geological Survey geological map P.2959 (Born *et al.* 1986) shows the presence of a few outcrops of dolostone in the northwestern part of Fenwick Township about 20 km north of Sault Ste. Marie. Although provisionally correlated with the dolomitic rocks of the Espanola Formation of the Huronian Supergroup, subsequent field investigations by P. Born and G. Bennett, indicate these dolostone beds are distinct from any previously known occurrences of sedimentary carbonate rocks in the Huronian Supergroup of Ontario.

The dolostone beds are exposed at two localities about 0.8 km apart. The unit is at least 20 m thick and lies in apparent fault contact with quartz arenites of the Lorrain Formation.

The dolostone is pale grey to pale pinkish-brown on weathered surfaces and pale grey to buff on fresh surfaces. For the most part the dolomitic unit is very thick bedded but locally thin beds of pale grey metachert are present. Dispersed irregular bodies of quartz up to 5 cm across may be nodules of metachert.

The dolomitic unit of Fenwick Township is directly overlain by medium-bedded, grey and red siltstone and sandstone, and laminated red siltstone.

The doloston, is unlikely to be a previously unreported facies of the Espanola Formation for the following reasons:

(1) The lowermost Huronian rocks in the area belong to the Gowganda Formation and lie directly on the Early Precambrian basement.

(2) The red siltstones and sandstones associated with the dolostone indicate a stratigraphic position at least as high as mid-Gowganda, since no red rocks have ever been recognized below that stratigraphic level in the Huronian Supergroup (Frarey 1977).

(3) The dolostone lacks the distinctive and readily visible, laminated, carbonate-grey siltstone beds of the Espanola Formation.

Kenneth Hatfield of Lake Superior State University of Sault Ste. Marie, Michigan has suggested that the dolostone of Fenwick Township may be equivalent to the Kona Dolomite of the Marquette area, Michigan. Samples of the Kona Dolomite provided by Hatfield show a striking resemblance to some of the dolostone in Fenwick Township. What is most interesting, however, is the fact that some writers have proposed, on the basis of lithological and (local) stratigraphic relationships, that the rocks which underly the Kona Dolomite of Michigan are equivalent to the Gowganda and Lorrain Formations of the Huronian Supergroup.

Additional field work will be carried out in the Summer of 1988 in order to further investigate the possibility that the Kona Dolomite of Michigan and the dolostone of Fenwick Township belong to the

Gordon Lake Formation of the Huronian Supergroup. The occurrence of anhydrite within the Gordon Lake Formation suggests an environment of deposition consistant with the deposition of primary dolostone (J. Wood, Regional Director, Northwestern Region, Ministry of Northern Development and Mines, personal communication, November, 1987).

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

During the late Summer of 1987, J.A.C. Fortesque of the Ontario Geological Survey initiated the first part of a three-year regional geochemical survey of the Batchawana greenstone belt. A total of 392 water and lake-sediment samples were taken from lakes over an area of 375 km^2 (centered on Wart Lake (47°10'N, 84°8'W). An outline of the objectives of this survey is given in Barlow *et al.* (1987).

During the Fall of 1987, Mary Gauvreau carried out an aggregate resources inventory of 15 geographic townships in the Echo Bay–Bruce Mines area and on St. Joseph Island, east of Sault Ste. Marie. The object of the field work was to outline and determine the quality and quantity of aggregate for road building and construction (Gauvreau *et al.* 1987).

PUBLICATIONS AND THESES ADDED TO THE SAULT STE. MARIE RESIDENT GEOLOGIST'S LIBRARY IN 1987.

Born, Peter
1987: Geology of the Havilland–Goulais Bay Area, District of Algoma; Ontario Geological Survey, O.F.R. 5602, 114p., 11 figures, 7 tables, 12 photos, and 3 maps in back pocket.

Fortescue, J.A.C., and Stahl, Hubert
1987: Geochemical Survey of the Mitchell Lake Area, District of Algoma; Ontario Geological Survey, Map 80 798, Geochemical Series. Compiled 1987.

Geological Survey of Canada
1987a: Regional Lake Sediment and Water Geochemical Reconnaissance Data, Province of Ontario (41J), O.F. 1356, 119p. 25 maps.
1987b: Regional Lake Sediment and Water Geochemical Reconnaissance Data, Province of Ontario (41O), O.F. 1357, 126p. 25 maps.

Goddard, Catherine Elizabeth
1987: The Geology of Paleosols at the Archean–Lower Huronian Unconformity, Elliot Lake, Ontario, Unpublished B.Sc. Thesis, Mount Allison University, Sackville, New Brunswick, 128p.

Grunsky,E.C.
1987a: Precambrian Geology of the Batchawana Synoptic Project Area, Agawa Bay Sheet, District of Algoma; Ontario Geological Survey, Map P.3059, Geological Series–Preliminary Map, scale l:50 000. Geology 1981–1984.
1987b: Precambrian Geology of the Batchawana Synoptic Project Area, Grey Owl Lake Sheet, District of Algoma; Ontario Geological Survey, Map P.3060, Geological Series–Preliminary Map, scale 1:50 000. Geology 1981–1984.
1987c: Precambrian Geology of the Batchawana Synoptic Project Area, Bulley Lake Sheet, Districts of Sudbury and Algoma; Ontario Geological Survey, Map P.3061, Geological Series–Preliminary Map, scale 1:50 000. Geology 1981–1984.
1987d: Precambrian Geology of the Batchawana Synoptic Project Area, Mamainse Point–Pancake Bay Sheet, District of Algoma; Ontario Geological Survey, Map P.3062, Geological Series–Preliminary Map, scale 1:50 000. Geology 1981–1984.
1987e: Precambrian Geology of the Batchawana Synoptic Project Area, Batchawana–Searchmont Sheet, District of Algoma; Ontario Geological Survey, Map P.3063, Geological Series–Preliminary Map, scale 1:50 000. Geology 1981–1984.
1987f: Precambrian Geology of the Batchawana Synoptic Project Area, Welcome Lake–Ranger Lake Sheet, Districts of Algoma and Sudbury; Ontario Geological Survey, Map P.3064, Geological Series–Preliminary Map, scale 1:50 000. Geology 1981–1984.

REFERENCES

Born, P., Worona, R., and Stephenson, C.
1986: Precambrian Geology of the Havilland–Goulais Area, District of Algoma; Ontario Geological Survey, Map P.2959, Geological Series–Preliminary Map, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1985.

Fortesque, John A. C., and Stahl, Hubert
1987: A Regional Geochemical Survey in the Wart Lake Area, District of Algoma; p.423-425 *in* Summary of Field Work and other Activities 1987, by the Ontario Geological Survey, edited by R.B. Barlow, M.E. Cherry, A.C. Colvine, Burkhard O. Dressler, and Owen L. White, Ontario Geological Survey, Miscellaneous Paper 137, 429p.

Gauvreau, Mary, Gorman, Robert, and Szoke, Steve
1987: Aggregate Resources Inventory of the Echo Bay-Bruce Mines Area and St. Joseph Island: p.384-386, *in* Summary of Field Work and other Activities 1987, by the Ontario Geological Survey, edited by R.B. Barlow, M.E. Cherry, A.C. Colvine, Burkhard O. Dressler, and Owen L. White, Ontario Geological Survey, Miscellaneous Paper 137, 429p.

Grunsky, E.C.
1980: Geology of the Cowie Lake Area, District of Algoma; Geological Survey Report 192, 67p. Accompanied by Map 2426, scale 1:31 680 or 1 inch to 1/2 mile.

10. Porcupine North and Porcupine South Resident Geologists' Area—1987

L.E. Luhta[1], P.J. Sangster[2], D.M. Draper[3], J.C. Ireland[4], M.P. Bradshaw[5], and C.D. Hamblin[6]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Timmins

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Timmins

[3]Data Geologist, Ontario Ministry of Northern Development and Mines, Timmins

[4]Economic Geologist, Ontario Ministry of Northern Development and Mines, Timmins

[5]Contract Geologist, Ontario Ministry of Northern Development and Mines, Timmins

[6]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Timmins

INTRODUCTION

The boundaries of the Porcupine North and South Resident Geologist's areas are coincident with those of the Porcupine Mining Division. On February 16, 1987, the following changes were made to the boundaries of the Porcupine Mining Division: a nine-township block bounded by Beemer, Zavitz, Nursey, and Halliday Townships was added; the northwestern boundary was extended from 85°20'W, 50°07'30"N to 86°30'W, 50°07'30"N; on the western and southern boundaries, a total of 61 townships were ceded to the Sault Ste. Marie Mining Division; and an additional 26 townships on the southern boundary were transferred to the Sudbury Mining Division.

RESIDENT GEOLOGISTS' STAFF ACTIVITIES

W.O. Mackasey, Resident Geologist, Porcupine North, was seconded to a provincial mining hazards program. Responsibility for the Porcupine North area has been assumed by the Porcupine South Resident Geologist's Office.

Staff of the Porcupine South Resident Geologist's office in 1987 included: L.E. Luhta, Resident Geologist; P.J. Sangster, Staff Geologist; C.D. Hamblin, Core Library Geologist; D.M. Draper, Data Geologist; M. Leroux, Core Library Assistant; and D.C. Egerland, Secretary.

J.C. Ireland continued working on a contract basis as Economic Geologist for the Swayze Belt. S.E.A. Calhoun also was hired on a contract basis as a six-month replacement Staff Geologist. M.P. Bradshaw was hired on a contract basis as Geologist, Porcupine North and M. King worked on contract as Core Library Assistant. Temporary staff hired under Experience '87 and Canada–Ontario Unemployment Insurance Section 38 Job Creation Program included S. Rogers, J. Ross, M. Kucheran, B. Mawdsley, R. Bertrand, and C. Philbert.

With sustained high gold prices and continued flow-through share funding, the level of exploration and development activity in this area remained very high in 1987. The Porcupine South Resident Geologists' staff spent considerable time in consultative duties with over 2200 office consultations recorded. Emphasis was placed on examining and reporting on properties currently being explored and/or developed.

Other staff activities in the past year included providing geological information to, and conducting field trips for, visiting academic and industry geologists. In 1987, groups from Ontario and Canada, and delegates from China, Finland, and the Soviet Union were introduced to the Porcupine Camp. The Regional Geoscience Seminar was presented in February 1987, and in October 1987, a Core Shack Exhibition was hosted by the Resident Geologist's Office, Porcupine South.

As of December 1987, there are nine gold mines, one base metal mine, and two producing industrial mineral deposits in the Porcupine Mining Division. There are 18 gold projects in the advanced evaluation and development stage. From 1910 to 1987, the camp has produced in excess of 57 million ounces of gold from 235 million tons of ore at an average grade of 0.26 ounce per ton.

DRILL CORE LIBRARY PROGRAM

During 1987, there were 366 representatives of government and industry who made use of the facilities of the Timmins Drill Core Library. Staff of the Core Library collected 26 944 m of drill core bringing the total core on file at the library to 118 212 m. This represents some 401 416 m of drilling. During 1987, drill core from the following sources was collected:

Argor Explorations Limited
Asarco Exploration Company of Canada Limited
Canadian Arrow Mines Limited
Canamax Resources Incorporated
Chevron Canada Resources Limited
Cominco Limited
Durham Geological Services Inc.
Esso Minerals Canada
Falconbridge Exploration Limited
Geological Survey of Canada
Kukatush Mining Corporation
Manville Canada Incorporated
MPH Consulting Limited
Newmont Exploration of Canada Limited
Noranda Exploration Company Limited
Northgate Exploration Limited
Ontario Geological Survey (BRIM Project)
Orofino Resources Limited
Pamour Incorporated (now Giant Yellowknife Mines Limited)

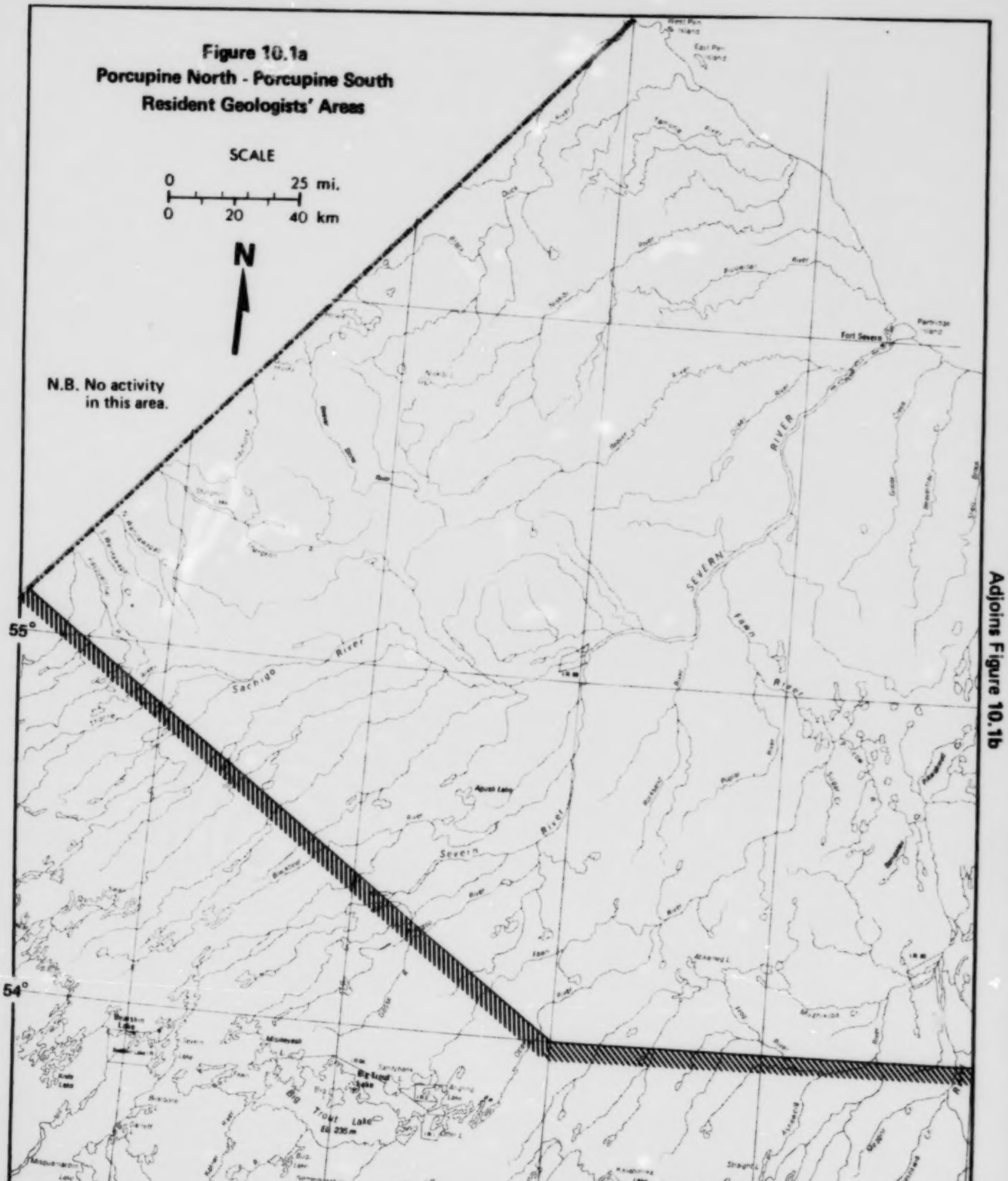

SCALE
0
25 mi.
0
20
40 km
N
N.B. No activity in this area.
West Pen Island
East Pen Island
Fort Severn
Partridge Island
SEVERN RIVER
Sachigo River
Severn River
Fawn River
Big Trout Lake
Winisk
55°
54°
91°
90°
89°
88°

Figure 10.1a
Porcupine North - Porcupine South
Resident Geologists' Areas

Adjoins Figure 10.1b

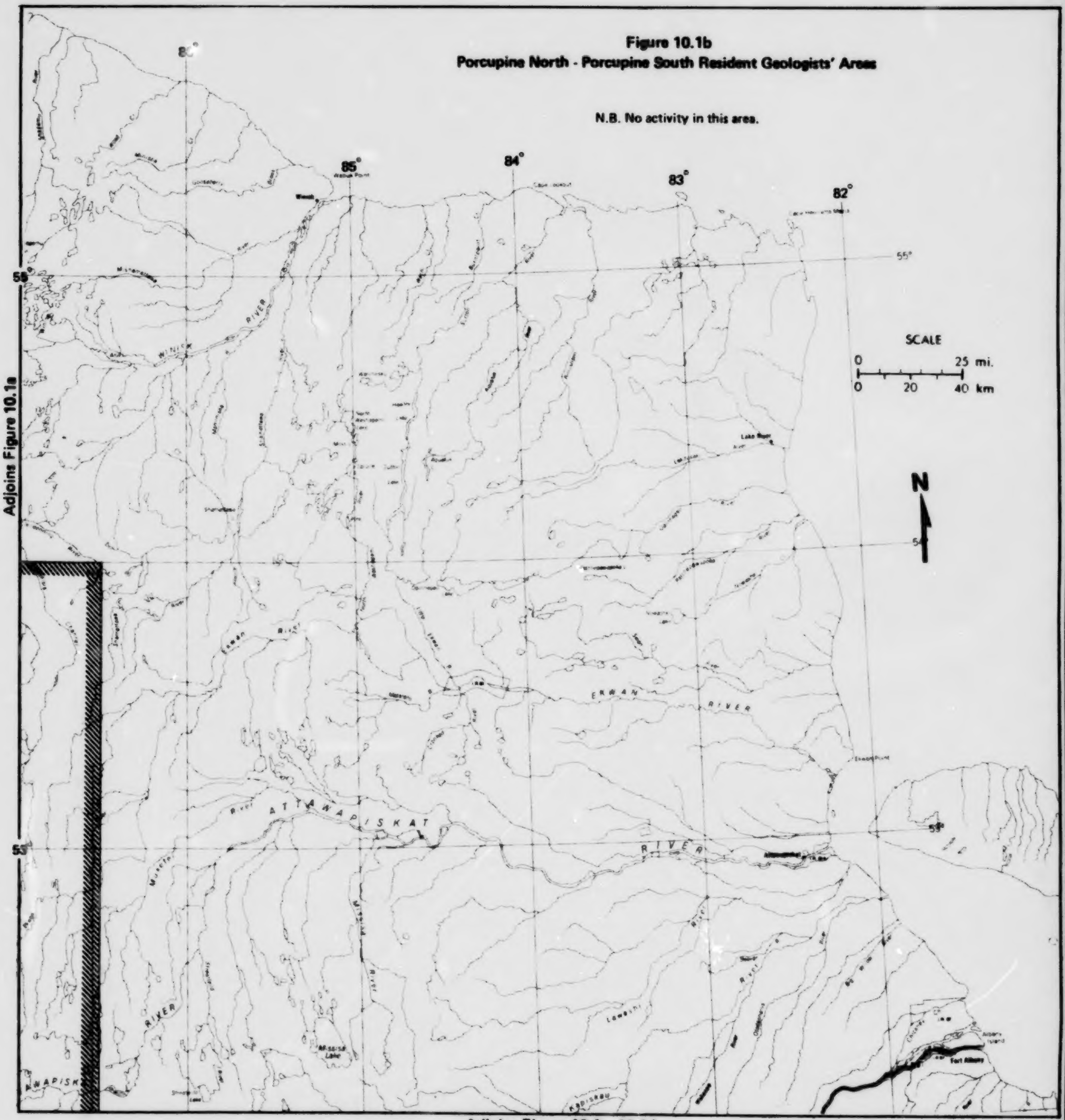

86°
85°
84°
83°
82°
55°
54°
53°
SCALE
0 25 mi.
0 20 40 km
N
WINISK RIVER
EKWAN RIVER
ATTAWAPISKAT RIVER
RIVER
Adjoins Figure 10.1a

Figure 10.1b
Porcupine North - Porcupine South Resident Geologists' Areas

N.B. No activity in this area.

Adjoins Figure 10.1c, 10.1d

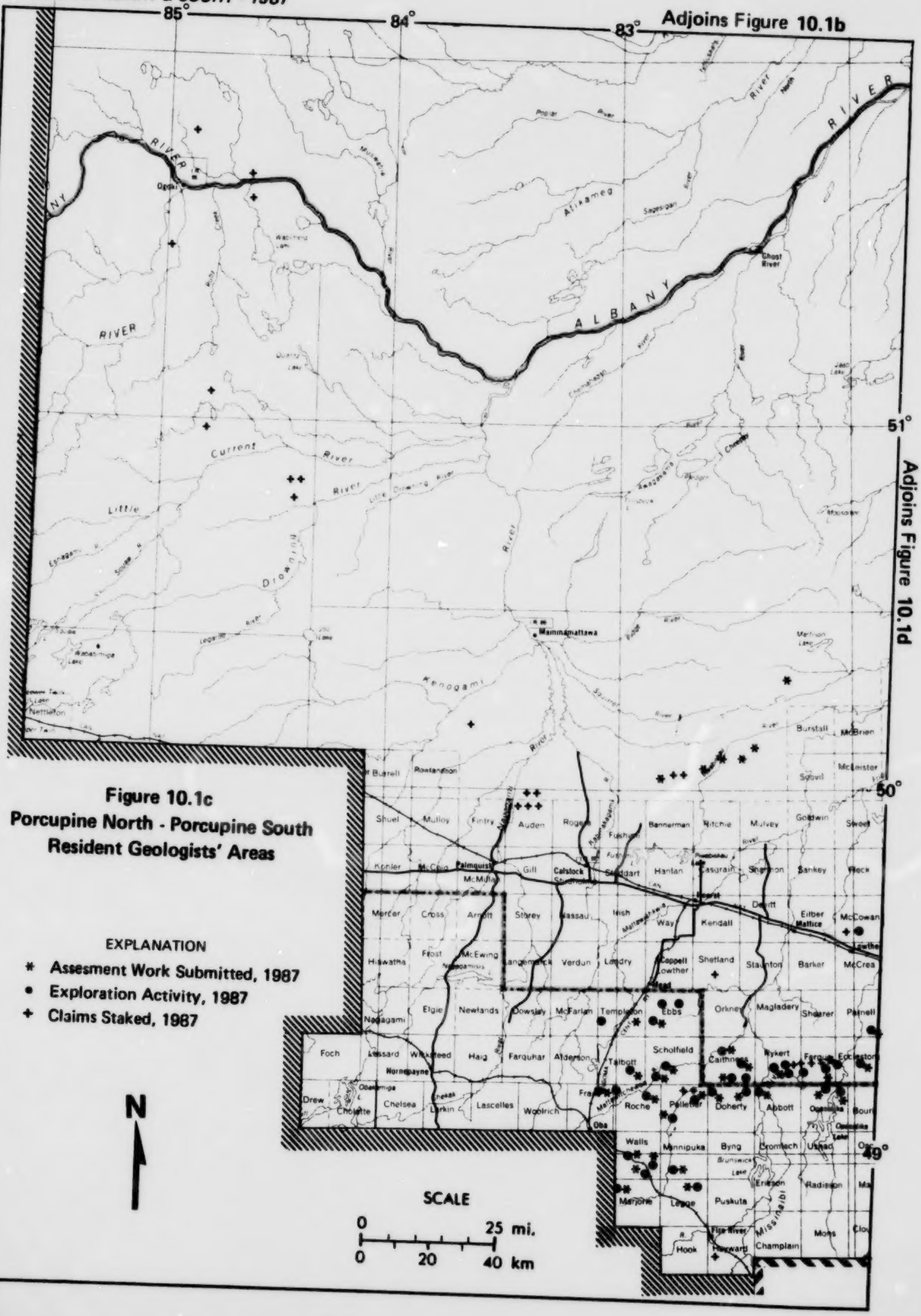

85°
84°
83°
Adjoins Figure 10.1b
Adjoins Figure 10.1d
51°
50°
49°
ALBANY RIVER
RIVER
Ogoki
Poplar River
Atikameg
Sagesigan River
Ghost River
Current River
Little Current River
Little Drowning River
Drowning River
Kenogami River
Mammamattawa
Squirrel River
Nettleton
Burstall
McBrien
McLeister
Sobvil
Burrell
Shuel
Mulloy
Fintry
Auden
Rogers
Fushimi
Bannerman
Ritchie
Mulvey
Goldwin
Sweet
Kohler
McCuig
Palmquist
McMillan
Gill
Calstock
Stoddart
Hanlan
Casgrain
Shannon
Sankey
Heck
Hearst
Devitt
Mercer
Cross
Arnott
Storey
Nassau
Irish
Way
Kendall
Eilber
Mattice
McCowan
Hiawatha
Frost
McEwing
Langemarck
Verdun
Landry
Coppell
Lowther
Shetland
Stavnton
Barker
McCrea
Nagagami
Elgie
Newlands
Dowsley
McFarlan
Templeton
Ebbs
Orkney
Magladery
Shearer
Parnell
Foch
Lessard
Wicksteed
Haig
Farquhar
Alderson
Talbott
Scholfield
Caithness
Rykert
Fergus
Eccleston
Hornepayne
Drew
Chelsea
Choate
Larkin
Lascelles
Woolrich
Franz
Roche
Pelletier
Doherty
Abbott
Oba
Walls
Mnnipuka
Byng
Cromlech
Brunswick Lake
Erikson
Radisson
Marjorie
Legge
Puskuta
Missinaibi
Fire River
Hook
Hayward
Champlain
Moss
N
SCALE
0 25 mi.
0 20 40 km
EXPLANATION
* Assesment Work Submitted, 1987
• Exploration Activity, 1987
+ Claims Staked, 1987

Figure 10.1c
Porcupine North - Porcupine South
Resident Geologists' Areas

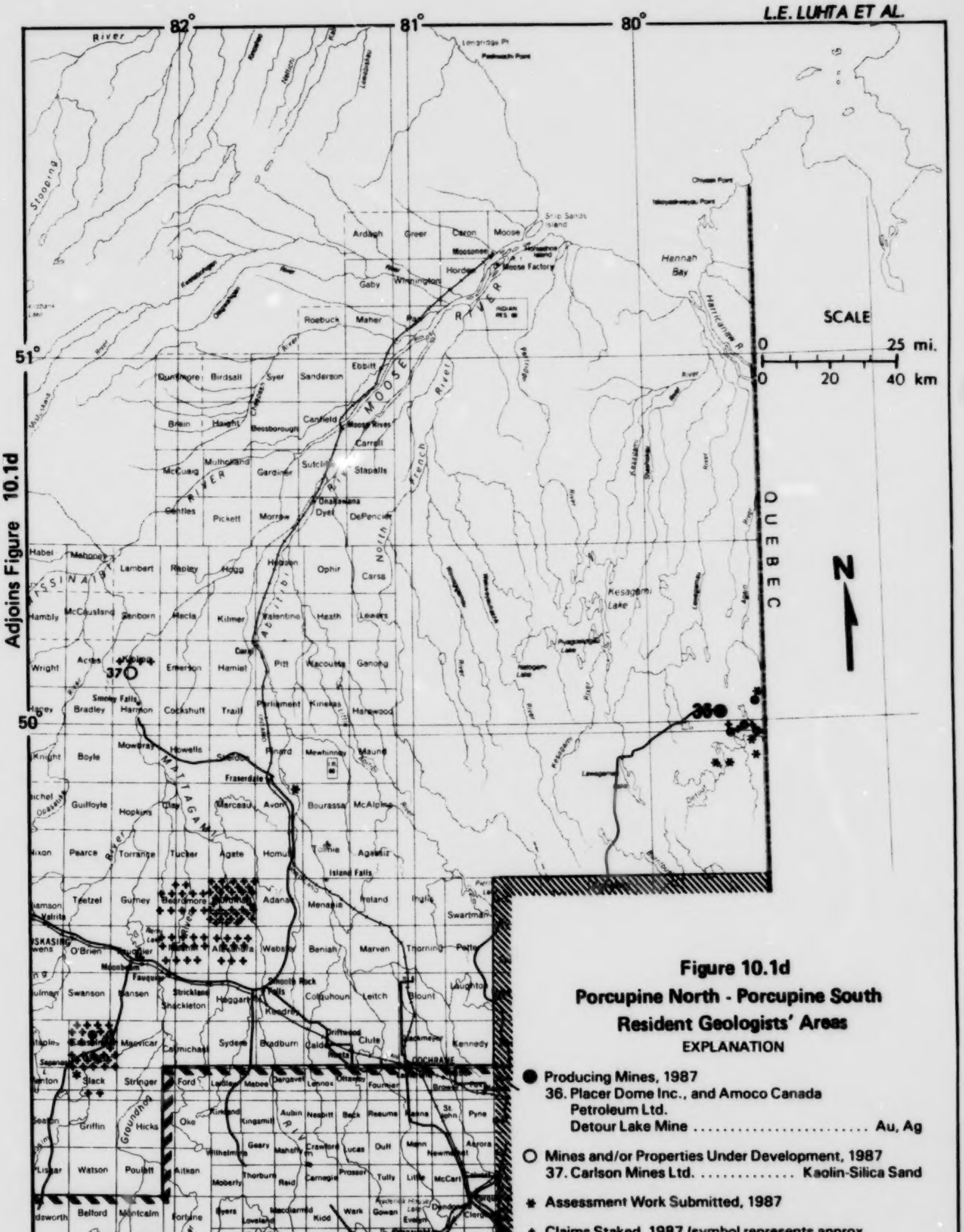

82°
81°
80°
51°
50°
River
Stooping
SCALE
0
25 mi.
0
20
40 km
N
QUEBEC
Hannah Bay
Harricana R.
Ship Sands Island
Moose Factory
Moosonee
Ardagh
Greer
Caron
Moose
Horden
Gaby
Wilmington
Roebuck
Maher
INDIAN RES.
MOOSE RIVER
Ebbitt
Dunsmore
Birdsall
Syer
Sanderson
Brain
Haight
Bessborough
Canfield
Moose River
Carroll
McCuaig
Mulholland
Gardiner
Sutcliffe
Stapalls
Gentles
Pickett
Morrow
Onakawana
Dyer
DePencier
North French River
Habel
Mahoney
Lambert
Rapley
Hogg
Hepsen
Ophir
Carss
Hambly
McCausland
Sanborn
Hecla
Kilmer
Valentine
Heath
Lewers
Wright
Acres
37
Emerson
Hamlet
Pitt
Wacoutta
Ganong
Smoky Falls
Harmon
Cockshutt
Traill
Parliament
Kineras
Harewood
Bradley
Kesagami Lake
36
Knight
Boyle
Mowbray
Howells
Pinard
Mewhinney
Maund
Fraserdale
Guilfoyle
Hopkins
Clay
Marceau
Avon
Bourassa
McAlpine
Hixon
Pearce
Torrance
Tucker
Agate
Homuth
Tolmie
Agassiz
Island Falls
MATTAGAMI
Teetzel
Gurney
Beardmore
Adanac
Menapia
Ireland
Inglis
Swartman
KAPUSKASING
O'Brien
Alexandra
Webster
Beniah
Marven
Thorning
Potter
Swanson
Hansen
Strickland
Shackleton
Haggart
Colquhoun
Leitch
Blount
Laughton
Calder
Sydere
Bradburn
Clute
Kennedy
Slack
Stringer
Carmichael
COCHRANE
Ford
Leblee
Mabee
Dargavel
Lennox
Ottaway
Fournier
Brower
Griffin
Hicks
Groundhog
Oke
Kingsmill
Aubin
Nesbitt
Beck
Reaume
Keena
St. John
Pyne
Wilhelmina
Geary
Mahaffy
Crawford
Lucas
Dutt
Mann
Newmarket
Aurora
Lisgar
Watson
Poulett
Aitken
Moberly
Thorburn
Reid
Carnegie
Prosser
Tully
Little
McCart
Belford
Montcalm
Fortune
Byers
Macdiarmid
Kidd
Wark
Gowan
Dundonald
Clergue
Loveland
Evelyn
Cote
Robb
Jamieson
Jessop
Murphy
Hoyle
Stock
Ossin
Nova
Strachan
Enid
Massey
Turnbull
Godfrey
Mountjoy
Tisdale
Whitney
Night Hawk Lake
Macklem
Bond
Timmins
South Porcupine
Adjoins Figure 10.1d
Adjoins Figure 10.1e

Figure 10.1d
Porcupine North - Porcupine South
Resident Geologists' Areas
EXPLANATION

● Producing Mines, 1987
36. Placer Dome Inc., and Amoco Canada Petroleum Ltd.
Detour Lake Mine . . . . Au, Ag

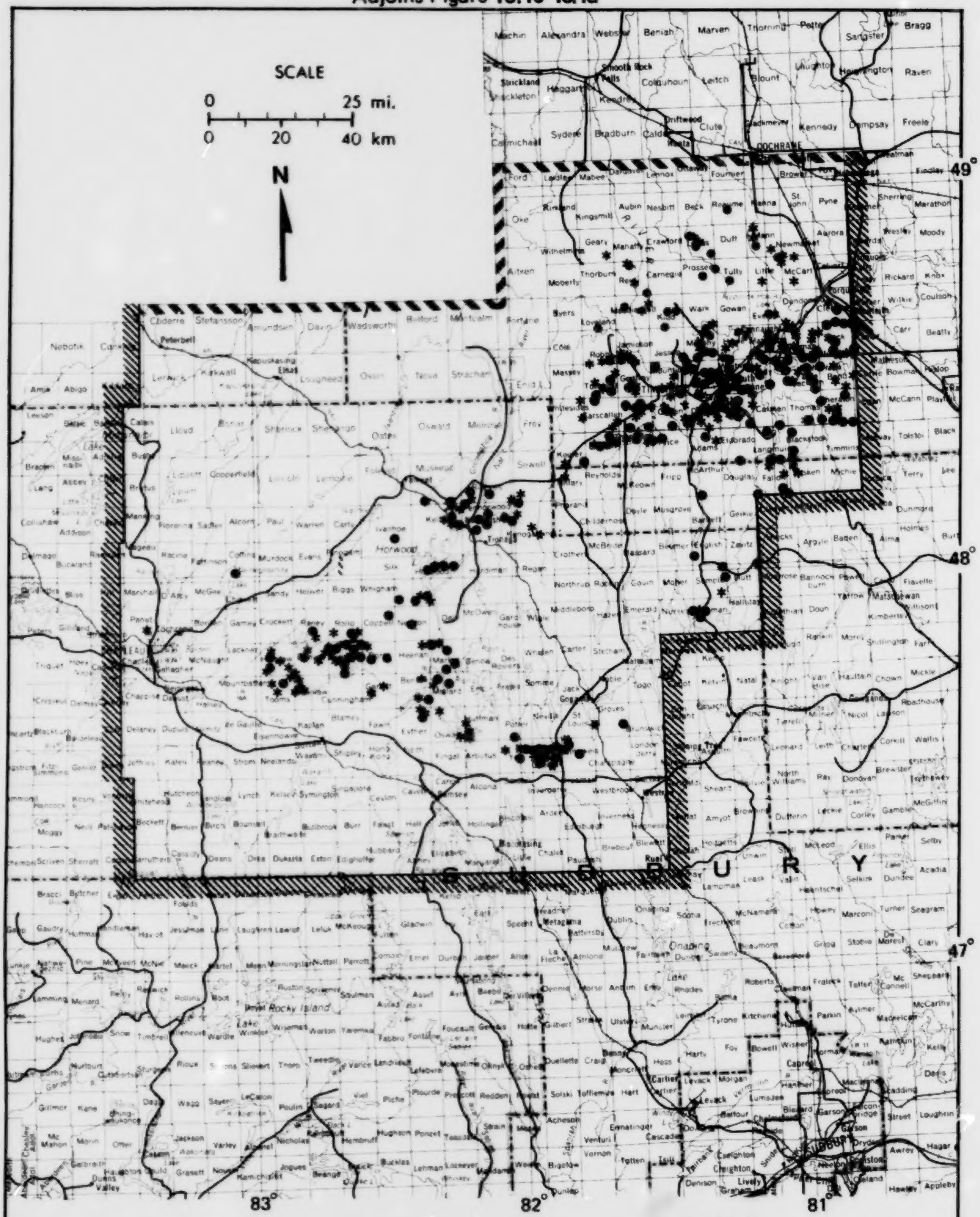
○ Mines and/or Properties Under Development, 1987
37. Carlson Mines Ltd. . . . . Kaolin-Silica Sand

✱ Assessment Work Submitted, 1987

✦ Claims Staked, 1987 (symbol represents approx. 20 claims)

• Exploration Activity, 1987

Adjoins Figure 10.1c 10.1d


SCALE
0
25 mi.
0
20
40 km
N
49°
48°
47°
83°
82°
81°
COCHRANE
Horwood
Rocky Island Lake
Onaping Lake
U
R
Y

EXPLANATION

- * Assessment Work Submitted, 1987
- • Exploration Activity, 1987

Figure 10.1e
Porcupine North - Porcupine South Resident Geologists' Areas

Priority Minerals Limited
Radio Hill Mines Company Limited
Robert S. Middleton Exploration Services Inc.
Shield Geophysics Limited

CLAIM STAKING ACTIVITY

From December 1, 1986, to November 30, 1987, 8837 claims were recorded in the Porcupine Mining Division. There are presently in excess of 36 686 active claims in the Division, representing 1 467 000 acres of unpatented ground, currently being explored. This figure does not include additional programs on patented ground.

Active stakers during 1987 included V. Larche, L. Salo, Ingamar Explorations, O. Hicks, and H. Gonzales.

Intensive staking was centred on the immediate Timmins area, the Swayze Belt, and over greenstone belts in the Oba and the Hearst–Kapuskasing areas. With the February boundary changes, the Porcupine South Resident Geologist gained nine townships from the Larder Lake Mining Division. These townships, which include Sothman, Semple, Beemer, and Zavitz, were also subject to intensive staking activity.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

From December 1986, to November, 1987, 41 programs in the Porcupine Mining Division were designated to receive assistance under OMEP. From total expenditures, in 1987, of $24 629 378, $17 834 700 were eligible for OMEP assistance.

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

Grant recipients with projects directly related to the Porcupine South Resident Geologist's area, during 1986 and 1987, are listed below.

Grant 236 Au-Quartz Vein and Cu-Au-Ag-Mo-Anhydrite Mineralization, Hollinger–McIntyre Mines, Timmins, Ontario; E.T.C. Spooner, C.J. Bray, P.C. Wood, D.R. Burrows, and N.J. Callan.

Grant 262 Geology, Geochemistry and Economic Significance of Carbonaceous Host Rocks in Gold Deposits of the Timmins Area; G.C. Wilson and J.C. Rucklidge.

Grant 280 Lead Isotope Study of Gold Mineralization in the Dome Mine Quartz-Fuchsite Vein; R.P. Moritz, J.H. Crocket, and A.P. Dickin.

Grant 298A The Geological Setting of Gold Deposits in the Porcupine Mining Camp; R. Mason and D.I. Brisbin.

Grant 298B Geology of the North Zone of the Delnite Mine at Timmins, Ontario; D.I. Brisbin, F. Speidel, and R. Mason.

The final reports summarizing the research for Grant 233-The Dating of Ontario's Gold Deposits, and Grant 236 are scheduled for release as Open File Reports.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

ABITIBI INITIATIVE

In 1987, recognizing the need for a comprehensive geological study of the Abitibi Greenstone Belt, the Precambrian Geology Section of the Ontario Geological Survey began the Abitibi Initiative. As part of this program, D.W. Piroschco and K. Kettles began a two-year mapping project in Whitney and Tisdale Townships. To date, work has been concentrated in the southern part of Whitney Township parallel to, but south of, the Porcupine-Destor Fault.

S. Marmont continued mapping in the Detour–Hopper–Sunday Lakes area.

D.J. Good began a study of magmatic mineral deposits with the intention of adding to the existing database for platinum group elements (PGE) both in the Abitibi Belt and elsewhere in Ontario.

COMMODITY STUDIES

The Ontario Geological Survey began a program in 1987 to investigate the PGE potential of the Abitibi Belt. D.J. Good briefly studied the Muskasenda Lake intrusion and the Mann Township Mafic-Ultramafic intrusion. Further examination of these areas is planned.

INDUSTRIAL MINERALS

M.J. Ford of the Precambrian Geology Section selected kaolinite samples from previous drilling by the Ontario Geological Survey and the Ontario Energy Corporation. These samples were examined with a scanning electron microscope.

Exposures of Cretaceous sedimentary rocks along Adam Creek were also examined. Preliminary results suggest that there is a potential for finding a source of high quality kaolinite in Ontario.

GEOPHYSICS–GEOCHEMISTRY SECTION

During the 1987 field season, the Night Hawk geophysical test range was utilized for testing research, and instructional purposes by industry, universities, and government agencies. The section completed a gravity survey of the Iroquois Falls–Lake Abitibi area and established 2000 gravity stations.

An airborne electromagnetic-magnetic survey was completed over a 64-township area centred on Timmins. The results are to be published early in 1988.

Adjoins Figure 10.1d, 10.1c

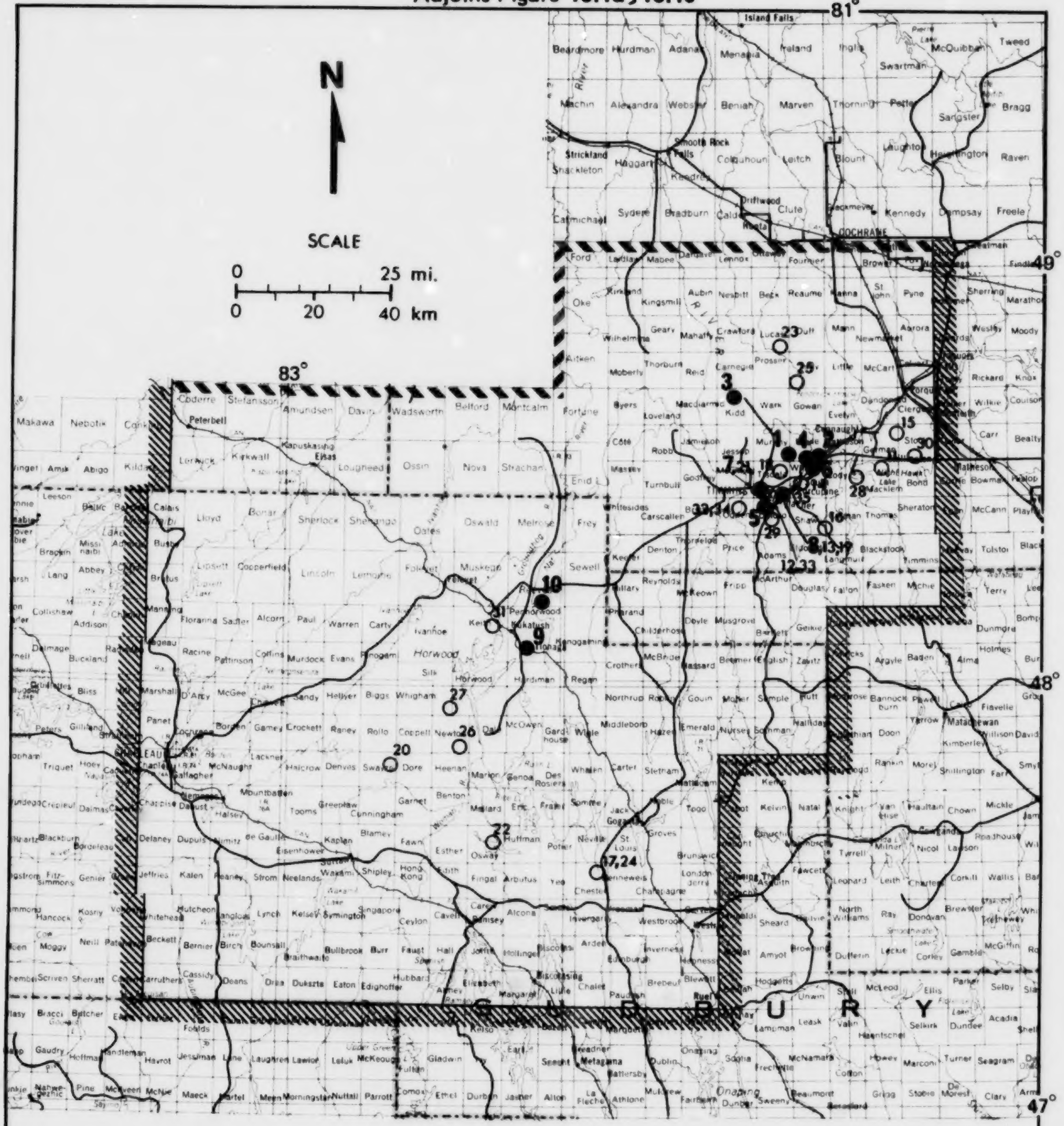

N
SCALE
0 25 mi.
0 20 40 km
81°
83°
49°
48°
47°
Island Falls
Smooth Rock Falls
COCHRANE
Timmins
Porcupine
Kapuskasing
Chapleau
Gogama
S U D B U R Y
Onaping
1
2
3
4
5
6
7,21
8,13,19
9
10
11
12,33
14
15
16
17,24
18
20
22
23
25
26
27
28
29
30
31
32,34

Figure 10.1f
Porcupine North — Porcupine South
Resident Geologists' Areas

Fig. 10.1f

EXPLANATION

[2]●	Producing Mines 1987	
1.	Canamax Resources Inc. and Pamorex Minerals Inc., Bell Creek Mine	Au
	Falconbridge Ltd.:	
2.	Hoyle Pond Mine	Au
3.	Kidd Creek Mine	Cu, Zn, Ag, Pb, Cd, Sn
4.	Owl Creek Open Pit Mine	Au
	Giant Yellowknife Mines Ltd.:	
5.	Delnite Property, Open Pit	Au
6.	No. 1 Mine and No. 3 Open Pit	Au, Ag
7.*	Schumacher Property	Au, Ag
7.*	Timmins Property	Au, Ag
8.*	Placer Dome Inc., Dome Mine	Au
9.	Roseval Silica Inc.	Si
10.*	Steetley Talc Ltd.	talc
[2]○	Mines and/or Properties Under Development, 1987	
11.	Asarco Exploration Ltd., Aquarius Mine	Au
12.*	Associated Porcupine Mines Ltd., Paymaster Property	Au
13.*	Augdome Corporation	Au
14.	Belmoral Mines Ltd. and Broulan Resources Ltd.	Au
15.	Canamax Resources Inc. and Bruneau Mining Corp. J.V., Clavos Property	Au
16.	Carshaw Property	Au
17.*	Chesbar Resources Inc. and Murgold Resources Inc.	Au
18.	Davidson Tisdale Mines Ltd. and Getty Resources Ltd.	Au
19.*	Diepdaume Mines Ltd., Preston East Property	Au
20.	Emerald Isle Resources Ltd., Kenty Property	Au
21.*	ERG Resources Inc.	Au
22.	Jerome Gold Mines Inc. and Muscocho Explorations Ltd.	Au
23.	Lucas Gold Resources Ltd., Lucas Property	Au
24.*	Monte Carlo Gold Mines	Au
25.	Noranda Exploration Co. Ltd. and Golden Princess Mining Corp.	Au
26.	Novamin Inc., Rundle Property	Au
27.	Orofino Resources Ltd., Swayze Property	Au
28.	Pamorex Minerals, Porcupine Peninsular Property	Au
29.	Pamarex Minerals, Deloro Property	talc-mgst
30.	St. Andrew Goldfields Ltd.	Au
31.	Sangold Property	Au
32.*	Stan West Mining Corp., Canacord Resources Inc. and Noranda Exploration Co. Ltd., Desantis Mine	Au
33.*	Vedron Ltd. and Belmoral Mines Ltd. J.V.	Au
34.*	Victoria Porcupine Resources, Naybob Property	Au
35.	Wabigoon Resources Inc., Hunter Property	Au

* Due to congestion, a single symbol may represent multiple properties.

Adjoins Figure 10.1c 10.1d

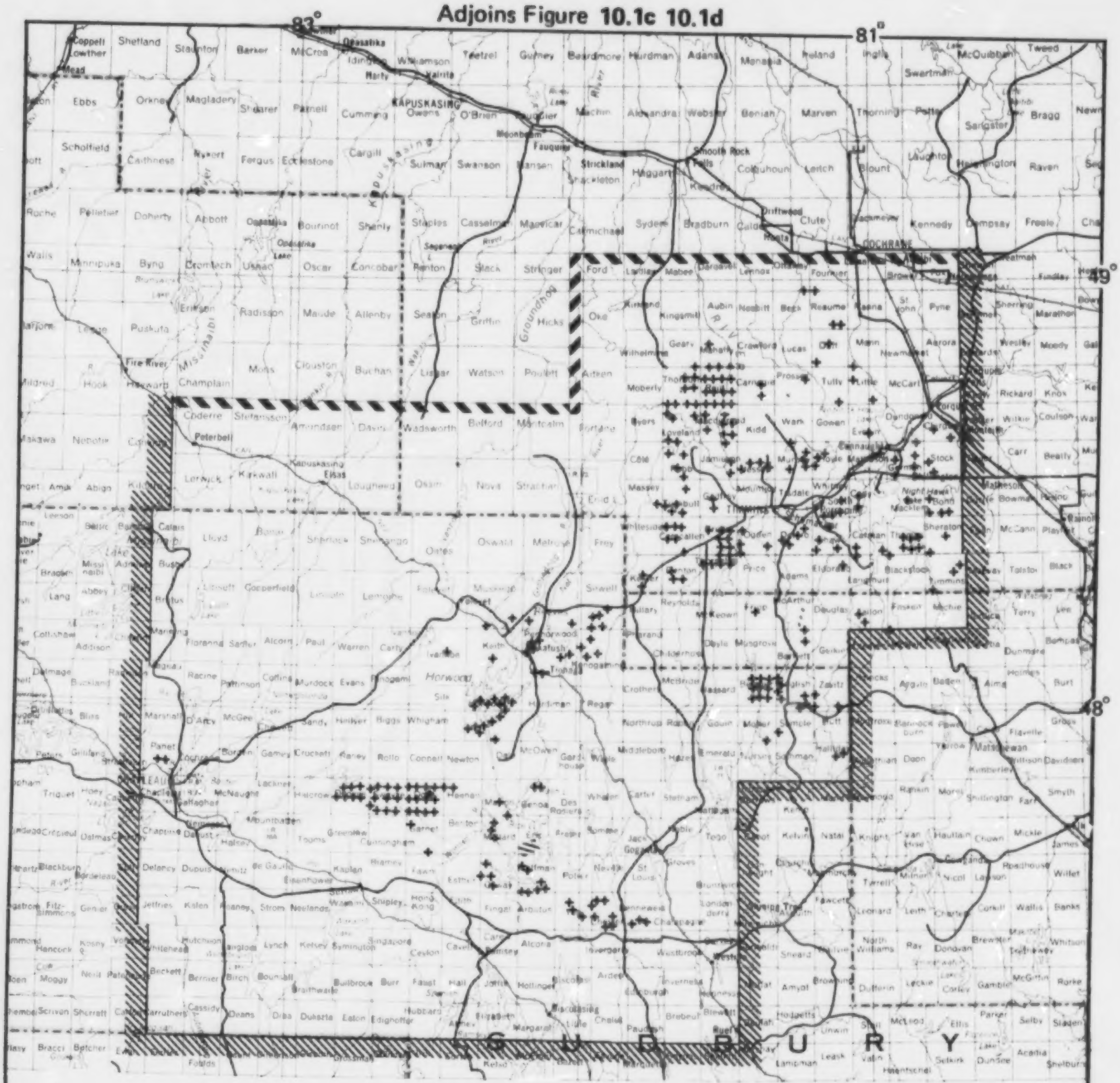
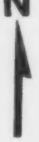

83°
81°
49°
48°
KAPUSKASING
COCHRANE
Timmins
S U D B U R Y

Figure 10.1g
Porcupine North - Porcupine South
Resident Geologists' Areas



EXPLANATION

+ Claims Staked, 1987 (+ per 20 claims)

SCALE

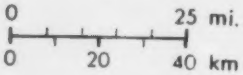

0
25 mi.
0
20
40 km

TABLE 10.1. SUMMARY OF CLAIMS RECORDED PORCUPINE MINING DIVISION 1967 - 1987

Year	Claims Recorded	Claims Active
1987*	8 457	37 399
1986	17 889	33 181
1985	6 052	23 207
1984	7 633	27 179
1983	11 859	30 586
1982	5 420	23 694
1981	8 934	24 731
1980	10 742	18 753
1979	3 975	9 597
1978	3 623	8 126
1977	2 438	8 923
1976	5 837	10 830
1975	4 162	8 614
1974	3 456	7 594
1973	2 258	6 460
1972	2 980	7 939
1971	3 840	7 250
1970	3 903	7 118
1969	3 482	7 131
1968	3 923	7 336
1967	2 944	8 319

* to Nov. 30/87

OPERATING MINES

BASE METAL

Falconbridge Limited, Kidd Creek Mine

Although complete figures were unavailable at the time of writing, estimated production from the Kidd Creek Mine in Kidd Township, for 1987, is 4 599 000 t grading 2.75 percent copper, 6.06 percent zinc, 0.23 percent lead, and 79 g/t silver. In 1986, 4 535 000 t of ore were mined to produce 102 000 t of copper metal at the Timmins metallurgical site and 2691 t of copper concentrate for sale. Zinc metal production, in 1986, was 133 505 t with an additional 76 479 t of zinc concentrate produced for sale. During 1986, 6.3 million ounces of silver were produced.

Seventy-seven percent of the production of the Kidd Creek Mine came from ten operating stopes in the No. 1 Mine between the 366 and 732 m levels. The bottom level at the No. 1 One Mine is at 792 m. Almost all of the ore above 366 m has been mined out (with only 100 000 t remaining in a pillar). The remaining 23 percent of production came from the No. 2 Mine from eight operating stopes between the 853 m and the 1219 m levels. Mining will begin on the 1402 m level at the end of 1988.

From 1966 to 1986, the Kidd Creek Mine has produced 72.4 million tons, at an average grade of 1.99 percent copper, 7.54 percent zinc, 0.30 percent lead, and 144 g/t silver. Ore reserves to a depth of 1524 m, published at the end of 1986, are 57.9 million tons grading 3.21 percent copper, 5.51 percent zinc, 0.16 percent lead, and 66 g/t silver. The mine has achieved its peak annual production rates during the last few years and planned production should start to gradually decrease.

In 1987, lateral underground development at the No. 1 and No. 2 Mines totalled 4438 m, and 3229 m, respectively. This compares to the 1986 figures of 5260 m and 5170 m respectively. Vertical development in 1987 totalled 2467 m at the No. 1 Mine and 955 m at the No. 2 Mine. This compares to the 1986 figures of 1611 m and 1354 m respectively.

Total underground diamond drilling in 1987 was 15 878 m of which 9324 m was delineation ore drilling. Primary ore definition drilling totalled 4420 m. This was done mostly from the 1402 m level to define ore between the 1524 m and 1828 m levels. Exploration drilling, totalling 2130 m in length, was also completed mainly from the 1402 m level. Surface drilling at the mine site totalled 2400 m. A program of 29 500 m of underground diamond drilling is budgeted for 1988. Long exploration holes are proposed to explore for possible satellite ore deposits in areas with favourable geology. Also, 3400 m of surface drilling is planned in 1988.

A program of expansion and replacement maintenance, which started in 1985, has been continuing at the company's metallurgical site. The copper smelter and refinery was expanded to 90 000 t of copper per year from 59 000 t per year. The zinc plant expansion to 136 000 t per year from 105 000 t is nearing completion.

Falconbridge Limited employed 2472 people in mining and metallurgy in the company's operation in Timmins during 1987. In 1986, 2495 people were employed. (Falconbridge Limited, personal communication, 1987).

PRECIOUS METALS

Detour Lake Mine

The Detour Lake Mine, a joint venture between Placer Dome Incorporated and Amoco Canada Petroleum Company Limited, became an underground mine officially on December 1, 1987. Open pit mining that reached 120 m below surface ceased on May 9, 1987. Total ore mined from the open pit was 3 600 000 t. Total production for 1987, was 750 000 t, at an average grade of 2.6 g/t gold, of which 366 000 t was open pit ore, 265 000 t was stockpiled low grade open pit material, and 119 000 t was hoisted from underground. At the end of 1987, the milling rate was 2200 t per day of which 1200 t was hoisted from underground and 1000 t was from the low grade surface stockpile.

The 1987 production was considerably lower than that of 1986, which was 2 685 847 g of gold recovered from 783 807 t at a grade of 3.74 g/t gold (at 94 percent mill recovery), due to the pause in production between open pit mining and underground mining. The low grade stockpiled pit material was milled during that time in an attempt to meet the shortfall in production.

Total lateral development in 1987 was 6000 m of which 400 m was ramp development. Vertical development totalled 22 500 m. The mining method at the mine is mechanized cut-and-fill with ramp access.

TABLE 10.2. OMEP PROGRAMS MINING DIVISION

Year	Number of Programs	Total Expenditures	Eligible Expenditures	OMEP Assistance
1987	41	24 629 378	17 834 675	4 458 675
1986	37	18 159 503	11 206 380	2 801 597
1985	74	32 435 117	24 112 511	5 965 632
1984	50	16 709 805	12 898 542	3 224 639
1983	32	14 859 000	10 642 000	2 660 000
1982	18	5 200 000	4 000 000	1 000 000
1981*	29	11 481 000	9 376 000	2 344 000
TOTAL	281	123 473 803	90 070 133	2 454 453

* incl. Sept. - Dec./80

There are three operating levels with the deepest production level at 550 m below surface.

In 1988, it is anticipated that the mine will produce 3 300 000 g of gold per year as underground production will be increasing.

Proven and probable reserves for the underground mine are 6 749 293 t at an average grade of 5.29 g/t gold.

The total number of people employed at the Detour Lake Mine at the end of 1987 was 234 (Detour Lake Joint Venture, personal communication, 1987; The Northern Miner, February 2, 1987; Dome Mines Incorporated, Annual Report, 1986).

Placer Dome Incorporated, Dome Mine

The Dome Mine, in South Porcupine, completed its 78th year of operation in 1987. A 50 percent expansion and modernization program was completed in 1985. This included a new shaft to access ore down to 5100 feet below surface. Although the 1987 figures were unavailable at the time of writing, it is expected that the Dome Mine will mine and mill 1 065 000 tons of gold ore grading 0.13 ounce gold per ton. This compares to the 1986 production of 137 023 ounces of gold, recovered from 1 060 000 tons of ore grading 0.134 ounce gold per ton. Ore sources, by mining method, are 60 percent longhole, 33 percent cut-and-fill, and 7 percent from development. Production has been gradually changing in the last few years, from longhole stoping to mechanized panel cut-and-fill stoping. The company had hoped to increase production from narrow vein cut and fill stopes; however, this has been inhibited by the present shortage of experienced miners. The lowest current production level at the Dome Mine is at the 3900- foot elevation.

Ore reserves at the end of 1985 were calculated to be 2 495 000 tons grading 0.174 ounce gold per ton. Historically, the Dome Mine has conservatively reported only proven ore reserves and then only those proven reserves which could be mined without further development costs. The mine will now be reporting reserves in accordance to normal Canadian industry practice which includes both proven and probable reserves which are mineable. This calculation for the Dome Mine has been completed and will be published in early 1988.

In 1987, 14 944 feet of lateral development (drifts, crosscuts, and subdrifts) and 1740 feet of raising were done. This figure was lower than the 1986 totals of 18 119 feet and 1930 feet respectively. In 1987, underground diamond drilling totalled 64 085 feet. Of this total, 6850 feet of exploratory drilling occurred in the new No. 8 Shaft area. In 1986, 64 500 feet of underground diamond drilling was completed. Surface diamond drilling for fill holes amounted to 2600 feet.

A $15 million mill expansion was started at the Dome Mine in 1987. The entire mill will be modernized with the 58-year old cyanide gold recovery section being replaced by a modern carbon-in-pulp circuit. The program completion date is set for mid-1988 and is expected to increase mill capacity from 3000 to 3300 tons per day.

The company has also built a new $1.2 million assay laboratory at the Dome Mine site. The new lab will have the capacity of handling mine samples and exploration assays as well as giving the company the ability to do environmental assays.

In 1987, a quarry was started, just to the northeast of the No. 8 Shaft, to supply rock to fill old shrinkage stopes in the mine. Raises will be driven from the top of some of the near-surface stopes to surface and the quarried rock will be dumped directly into the stopes. An estimated 1.5 million tons of rock will be used for this purpose.

The company is presently researching a dense-fill system. Mill tailings are centrifuged and the resulting dense fraction is pumped underground into stopes as fill.

A total of 753 people were employed at the Dome Mine in 1987, compared to 773 in 1986. (Placer Dome Incorporated, personal communication, 1987).

Giant Yellowknife Mines Limited

In late 1986, Pamour Incorporated sold its Timmins operations to Giant Yellowknife Mines Limited for cash and shares. As a result, Pamour Incorporated became a holding company, controlling Giant Yellowknife Mines Limited, which became the operating company.

Although the final 1987 figures are not yet available, the company anticipates recovering 121 000 ounces of gold from 1 888 000 tons of ore at an average grade of 0.072 ounce gold per ton, and average mill recovery rates of approximately 85 percent, from six mining operations. This is compared to 1986 production totals of 110 849 ounces of gold, 125 600 ounces of silver, and 110 tons of copper from 1 791 771 tons of ore at an average gold grade of 0.074 ounce gold per ton.

At Giant Yellowknife Mines Limited's GOMILL, the company custom milled development ore from the Canamax Resources–Pamorex Minerals Bell Creek Mine and refinery brick from Sabin Brick. At the Pamour No. 1 Mill, custom milling was also done for some production ore from the Bell Creek Mine.

At the Schumacher Mine, 1987 production is expected to be 187 150 tons at an average grade of 0.068 ounce gold per ton. A total of 1950 feet of underground development and 5478 feet of stope preparation was done, as well as, 19 300 feet of diamond drilling. Most of the ore came from the salvage mining of old shrinkage stopes. Presently, the company is experimenting with drilling holes along the walls of the old stopes, using a diamond drill, in order to obtain core for grade determination, and to use the holes as blastholes if core samples are of ore grade. One significant project being carried out is the driving of a new ore pass from the 2875-foot level to the 1125-foot level in the Six Shaft area. Exploration drilling at Schumacher Mine was concentrated on outlining high gold zones in the copper deposit, and gold-bearing structures within the Pearl Lake Porphyry. In 1987, considerable emphasis was placed on exploration and development at the Schumacher Mine.

At the No. 1 Mine, the 1987 production is expected to be 702 000 tons grading 0.074 ounce gold per ton. Six thousand feet of development and 12 000 feet of stope preparation were done, as well as, 32 000 feet of underground diamond drilling.

It is estimated that the Ross Mine will have produced 215 444 tons of ore grading 0.118 ounce gold per ton in 1987. A total of 3437 feet of development and 4446 feet of stope preparation were completed in 1987, as well as, 17 453 feet of diamond drilling.

The open pit at the Timmins Property is expected to produce 119 873 tons grading 0.075 ounce gold per ton in 1987. The open pit at the Delnite Mine will produce 50 000 tons at a similar grade.

The No. 3 open pit operation is currently the lowest cost producer Giant Yellowknife has in Timmins. In 1987, it is estimated that 614 000 tons grading 0.055 ounce gold per ton will be produced. When operations began in 1985, the pit was to have a three-year life. As a result of intensive diamond drilling in 1986, that figure has been tripled to nine years, that is, to the end of 1993. Present reserves are 3.6 million tons grading 0.062 ounce gold per ton. As well, 2.9 million tons of potential heap leach material grading 0.029 ounce gold per ton has been identified and will have to be removed as part of the mining plan. Surface diamond drilling, totalling a length of 3046 feet, was done during 1987 at the No. 3 Pit.

As a result of an extensive, continuing, surface diamond-drill program, in which 22 800 feet were drilled, Giant Yellowknife Mines Limited outlined 70 000 tons of ore grading 0.08 ounce gold per ton and minable by open pit, within conglomerate, south of Highway 101, just east of their No. 3 Pit. An additional half a million tons of potential ore were indicated by diamond drilling, and may be mined underground via a decline ramp which would be driven from the surface. Present diamond drilling is testing the greywacke to the south.

A heap leach test, funded partly through a Northern Ontario Regional Economic Development Fund (NOR-DEV) grant, was started in late 1986. Two 10 000-ton heaps, crushed to minus 3/8 inch, were placed on a polyethylene-lined pad behind the No. 1 Mill site. One heap consisted of gold-bearing greywacke from the No. 3 Pit. The adjacent heap consisted of volcanic rock from the Timmins property. Leaching of the ore from the Number Three Pit began in late 1986, and, after a break during the winter, was finished in the spring of 1987. A recovery of 73 percent was obtained. The ore grade was 0.034 ounce gold per ton. The heap from the Timmins property was of similar grade and was leached in 1987. Preliminary results indicate that the gold recovery will be comparable.

Heap leaching began on a production scale in September, 1987, with the spraying of a 140 000-ton heap derived from the No. 3 Pit. Spraying continued through to December, 1987, and will resume again in April, 1988. At the end of 1987, the loading of two more piles was in progress.

At the end of 1987, Giant Yellowknife Mines Limited employed 764 people at its Timmins operations. The company employed 760 people in 1986 (Giant Yellowknife Mines Limited, personal communication, 1987).

Owl Creek Mine

At Falconbridge Limited's Owl Creek open pit gold mine in Hoyle Township, production, in 1987, totalled 176 695 t (194 812 tons) from which 951 750 g (30 600 ounces) of gold were recovered. Average head grade was 6.2 g/t (0.182 ounce per ton) gold. The high grade ore, which amounted to 17 percent, was milled at the company's gold mill at their metallurgical site. During October and November, 45 percent of the total ore mined was put through a spare circuit in the company's base metal concentrator. The remaining 38 percent was custom milled at Asarco Exploration Company of Canada Limited's Aquarius Gold Deposit mill, in Macklem Township.

Mining in the open pit is presently taking place at the sixth bench. The tenth bench is the last bench to be mined, at 106 m below the bedrock surface. Remaining ore reserves are 420 000 t grading 4.5 g/t gold. Also, 15 000 t at the same grade has been broken and stockpiled.

Mining is continuing and most of the ore is being stockpiled. At present, only the higher grade ore is milled in the company's gold mill. Custom milling at the Aquarius mill ceased in December 1987. The stockpiled ore will be milled in the base metal mill in two batches tentatively scheduled for April and October 1988.

A 5180 m long diamond-drill program has been started at the mine, to explore beneath the pit. Holes averaging 762 m in length will be drilled to outline potential ore for underground mining. At the end of 1987, 1158 m have been drilled. (Falconbridge Limited, personal communication, 1987)

Hoyle Pond Mine

In 1987, Falconbridge Limited's Hoyle Pond underground gold mine produced 103 500 t grading 18 g/t gold. Recovered gold was 1 726 216 g or 55 500 ounces. The decline ramp is presently at 226 m below surface. Lateral underground development, in 1987, totalled 1923 m and vertical development totalled 486 m. Underground diamond drilling totalled 21 100 m and surface drilling 13 500 m. Nine cut-and-fill stopes are presently in production. These stopes are between 1.2 and 3.5 m wide. Mucking is done by slushers and in some stopes, by half-yard scoop trams.

Presently, reserves are 400 000 t at an average grade of 19 g/t gold. Exploration is taking place to the west, on property purchased from the Schumacher Estate, and an exploration drift is advancing eastward. North and south of the main gold mineralization, pyritic zones 4 to 6 m wide which average 6 to 7 g/t gold have been located. These are being outlined and evaluated. (Falconbridge Limited, personal communication, 1987.)

Canamax Resources Incorporated/Pamorex Minerals Incorporated, Bell Creek Mine

The Bell Creek Mine in Hoyle Township is jointly owned by Pamorex Minerals Incorporated and Canamax Resources Incorporated (operator). The mine was placed into commercial production on January 1, 1987. Although the 1987 figures were unavailable at the time of writing, it is estimated that 296 692 g (9539 ounces) of gold will be recovered from 52 637 t of ore at an average grade of 6.50 g/t gold. At the Pamour No. 1 mill, 20 497 t were custom-ed milled between January and May 1987. The remaining 32 140 t were milled at the Bell Creek mill, which was completed in August. When in full production in 1988, the mine is expected to produce 777 587 g annually from a 350 t per day milling operation. Presently, 65 percent of the gold is recovered through gravity separation due to the large amount of coarse visible gold in the ore. Proven and probable reserves in three zones at the mine total 902 500 t grading 6.3 g/t of gold (995 000 tons at 0.185 ounce gold per ton).

Mining is being conducted on the North "A" Zone which has proven reserves of 477 500 t at 6.07 g/t of gold. Vertical sublevel retreat mining is taking place between the 60 m and 180 m levels on the eastern side. Shrinkage mining between the 180 m and 120 m levels is taking place on the western side where the ore zone is narrower. Presently, the bottom level is at 240 m. The shaft is down to 305 m. A total of 2172 m of lateral development and 342 m of vertical development was completed at the Bell Creek Mine in 1987. Also, 254 m of underground drilling was done.

Some crosscutting was done through the lower grade North "B" Zone which is 30 m to the north of the "A" horizon. Underground diamond drilling will be done to evaluate this zone from the underground workings on the "A" Zone in 1988. Also in 1988, an exploration drift will be driven on the 240 m level in order to establish diamond-drill stations to define the North "A" Zone at depth. The drilling is scheduled for 1989. The 240 m level will be pushed westward through a diabase dike to explore for the North "A" Zone at depth.

A decline from surface was started on the Marlhill Zone, 400 m north of the North Zone, in 1986. By the end of 1987, the ramp was 75 m below surface. This ramp is scheduled to reach the 150 m level before the end of 1988. Levels have been established on the 25 m level which has accessed the M-1, M-2, and M-3 Veins. A vent raise was driven from the 50 m level to the surface and a raise in ore on the M-3 vein was started on the 50 m level.

A total of 1438 m of lateral development (435 m of which was in ore) was completed at Marlhill in 1987, as well as 66 m of vertical development, and 208 m of underground diamond drilling. (Canamax Resources Incorporated, personal communications, 1987).

INDUSTRIAL MINERALS

Steetley Talc Limited

In 1987, Steetley Talc Limited mined 90 000 tons of ore by open pit methods. Ore milled totalled 125 000 tons, including stockpiled ore from previous mining. Of this 400 000 tons of beneficiated talc was produced, 5000 tons more than in 1985 and 1986. The ore is mined and the talc concentrated at the mine site in Penhorwood Township. The concentrate is trucked to the company's fine-grind plant in Timmins. At present, the plant is running at 450 tons per day from which 150 tons of beneficiated talc are produced.

In 1987, Steetley Talc Limited completed a $4.2 million expansion, bringing the total talc producing capabilities to 60 000 tons per year. The company has experienced a steady growth in sales. This is due to the present boom in the pulp and paper industry which is a major customer, and the gradual increase of Steetley Talc Limited's market share over its competitors.

Steetley Talc Limited presently employs 50 people at its operations, the same as in 1985 and 1986 (Steetley Talc Limited, personal communication, 1987).

Roseval Silica Incorporated

Roseval Silica Incorporated holds 65.6 hectares under Quarry Permit, and two unpatented claims on a number of high quality quartz vein occurrences in southwest Penhorwood Township. In 1987, Roseval Silica Incorporated evaluated two potential quarry sites outlined during geological reconnaissance mapping in the area. Site 1 is located 4.2 km west of

TABLE 10.3 GOLD PRODUCTION: PORCUPINE SOUTH RESIDENT GEOLOGIST'S AREA (TO THE END OF 1986)

MINE NAME	TOWNSHIP	YEARS OF PRODUCTION	TONS MILLED	OZ. PRODUCED	GRADE
Ankerite	Deloro	1926-1953,-78	4,993,929	957,292	0.19
Ankerite/March	Deloro	1926-1935	317,769	61,039	0.19
Aunor (Pamour No. 3)	Deloro	1940-1984	8,482,174	2,502,214	0.30
Banner	Whitney	1927-28,-33,-35	315	670	2.13
Bonetal	Whitney	1941-1951	352,254	51,510	0.15
Bonwhit	Whitney	1951-54	200,555	67,940	0.34
Broulan	Whitney	1939-53	1,146,059	243,757	0.21
Cincinnati	Deloro	1922-1924	3,200	736	0.23
Concordia	Deloro	1935	230	16	0.07
Coniaurum/Carium	Tisdale	1913-18, 1928-1961	4,464,006	1,109,574	0.25
Crown	Tisdale	1913-1921	226,180	138,330	0.61
Davidson	Tisdale	1918-1920	9,341	2,438	0.26
Delnite	Deloro	1937-1964	3,847,364	920,404	0.20
DeSantis	Ogden	1933,1939-42, 1961-1964	196,928	35,842	0.18
DeSantis	Turnbull	1926		13	
Detour Lake Mine	**Sunday Lake**	**1983-**	**2,759,000**	**247,043**	**0.10**
Dome	**Tisdale**	**1910-**	**43,106,914**	**11,322,054**	**0.27**
Faymar	Deloro	1940-1942	119,181	21,851	0.18
Fuller	Tisdale	1940-1944	44,028	6,566	0.15
Gillies Lake	Tisdale	1929-31,35-37	54,502	15,278	0.28
Goldhawk	Cody	1947	636	53	0.08
Halcrow-Swayze	Halcrow	1935	211	40	0.19
Hallnor (Pamour No. 2)	Whitney	1938-68,-81	4,226,419	1,645,892	0.39
Hollinger--Schumacher	**Tisdale**	**1915-1918**	**112,124**	**27,182**	**0.24**
Hollinger (Pamour Timmins)	**Tisdale**	**1910-1968,**	**65,778,234**	**19,327,691**	**0.29**
		1976-	**2,274,200**	**160,675**	**0.07**
Hoyle	Whitney	1941-44,46-49	725,494	71,843	0.10
Hoyle Pond	**Hoyle**	**1985-28**	**173,228**	**96,550**	**0.61**
Hugh-Pam	Whitney	1926,1948-65	636,751	119,604	0.19
Jerome	Osway	1941-43,1956	335,060	56,893	0.17
Joburke	Keith	1973-75,79-81	302,561	28,440	0.09
Kingbridge/Gomak	Chester	1935-36	1,387	98	0.07
McIntyre (Pamour Schumacher)	**Tisdale**	**1912-**	**37,357,722**	**10,735,319**	**0.29**
McLaren	Deloro	1933-37	876	201	0.23
Moneta	Tisdale	1938-1943	314,829	149,250	0.47
Naybob	Ogden	1932-1964	304,100	50,731	0.17
Owl Creek	**Hoyle**	**1981-**	**1,164,000**	**139,360**	**0.12**
Pamour No. 1 (inc. #3 Pit)	**Whitney**	**1936-**	**30,480,831**	**3,162,008**	**0.11**
Paymaster	Tisdale	1915-1966	5,607,402	1,192,206	0.21
Porcupine Lake/Hunter	Whitney	1937-40,1944	10,821	1,369	0.13
Porcupine Peninsular	Cody	1924-27,-40,-47	99,688	27,354	0.12
Preston	Tisdale	1938-1968	6,284,405	1,539,355	0.24
Preston N Y	Tisdale	1933	2,800	153	0.05
Preston/Porcupine Pet	Deloro	1914-1915		314	
Preston/Porphyry Hill	Deloro	1913-1915	46	312	6.78
Reef Mine	Whitney	1915-1965	2,144,507	498,932	0.23
Tionaga/Smith-Thorne	Norwood	1938-1939	6,653	2,299	0.35
Tisdale Ankerite	Tisdale	1952	14,655	2,236	0.15
Tommy Burns/Arcadia	Shaw	1917	21	14	0.28-0.34
Vipond	Tisdale	1911-1941	1,565,218	414,367	0.26
TOTAL NO. OF MINES:	49				
			230,248,808	57,155,308	0.26

BASE METAL PRODUCTION: PORCUPINE SOUTH RESIDENT GEOLOGIST'S AREA (TO THE END OF 1986)

Mine	Township	Dates	Ore Milled (Tonnes)	%Cu	%Zn	%Ni	Ag (G/Tonne)	Au
Alexo	Dundonald	1912-19 1943-44	51 529	0.07		3.93		
Canadian Jamieson	Godfrey	1966-71	434 409	2.39	4.05			
Jameland	Jamieson	1969-72	461 805	0.99	0.88		3.5	0.05
Kam Kotia	Robb	1943-44 1961-72	6 007 194	1.09	1.03		3.5	0.05
Kidd Creek Mine	**Kidd**	**1965-**	**72 400 000**	**1.99**	**7.54**		**144.0**	
Langmuir	Langmuir	1973-77	997 903			1.5		
McIntyre	Tisdale	1963-81	10 162-640	0.62			0.09	0.023
United Obalski	Godfrey	1965-66	Data Unavailable					

Bold face denotes active mine; for example, Detour Lake Mine.

Tionaga Station on the Canadian National Railways mainline, approximately 300 m south of the tracks. In 1964 and 1965, Horwood Mining Limited quarried silica from the northeast end of the vein which has been traced intermittently for a length of 756 m. Widths are variable between 4 and 25 m, and dips are near vertical. Roseval Silica Incorporated did limited stripping on the Site 1 Vein and diamond drilled two holes totalling 23.2 m. The blocky, fractured nature of the quartz made percussion drilling necessary and a 53-hole program totalling 768 m was completed on the vein. Quartz chips were sampled in 1.52 m increments and analysed for Fe_2O_3, Al_2O_3, TiO_2, and CaO impurities.

The Site 2 Vein is on the Extender Barite Road, 2.6 km west of Tionaga Station and 500 m north of the rail line. The area was stripped and tested with 15 percussion drill holes totalling 200 m. Quartz chips from the percussion holes were analysed for impurities.

Roseval Silica Limited began quarrying the Site 2 Vein with the intention of producing a 2000 t bulk sample. The high quality quartz was trucked 1.7 km to the Canadian National Railways gravel pit at Tionaga and stockpiled. The material was processed through a 91 t per day portable crusher to produce a 90 percent, 5 cm by 10 cm sized fraction. This material was washed, hand sorted, and loaded by conveyor belt into 91 t rail cars. Undersized material was stockpiled on site. A total of 1606.04 t was shipped to the SKW Canada Incorporated furnaces in Becanour, Quebec, for testing, to determine the suitability of the quartz for producing high-quality silicon-metal. Silicon-metal is used as an alloying agent in the production of specialty steels (Roseval Silica Incorporated, personal communication, 1987).

PROPERTY EVALUATION AND DEVELOPMENT

ERG Resources Inc.

ERG Resources Inc., a subsidiary of Pamour Inc., is proposing to treat 151 million tons of gold-bearing mill tailings controlled by the company in the Timmins area. Previous sampling has indicated that these tailings contain between 0.005 and 0.05 ounce gold per ton. Extensive laboratory and pilot plant test programs have shown that a gold recovery rate of over 40 percent is possible. Engineering studies indicate that economical retreatment is feasible given high enough processing rates and newer technology. The project will have a minimum duration of 17 years.

Construction of the ERG mill and the new tailings deposition dam commenced in August and September, 1987. Total capital costs are estimated to be $73.5 million. The ERG mill is to be located at the northern end of the existing Schumacher Mine site in Tisdale Township. The new tailings dam will be located 10 000 feet northeast of the mill site. The process plant will consist of a flotation section, thickening, leach, and carbon-in-pulp sections located outdoors. Regrind mills, workshops, carbon stripping, refinery, and other facilities will be in a mill building.

Initially in Phase I, three tailings areas of the McIntyre Mine, located within the Gillies Lake and Pearl Lake basins and north of the mine, will be processed. As well, the old Coniaurum Mine tailings and a portion of the Hollinger tailings will be milled. Eventually, tailings from the Giant Yellowknife Mine Schumacher mill (80 000 tons per month) will also be fed directly into the ERG mill where additional gold will be recovered. These tailings grade about 0.011 ounce gold per ton. Total treatment rate will be one million tons per month for eight months each year. Operations will cease during the winter months. Mining will be done with high pressure water jets with the reslurried tailings being pumped to the plant site. The ERG mill is expected to recover an average of 80 000 ounces of gold per year over the first three years of full production at a cost of $175 per ounce. Later, gold recovery will decrease and costs will increase to $350 to $400 per ounce since the higher grade tailings will be processed first.

During construction, the project will require an average of 150 workers and the permanent work force required will be approximately 50 people (ERG Resources Incorporated, information brochure, November 1987, Assessment Files, Resident Geologist's Office, Timmins)

Asarco Exploration Limited, Aquarius Mine

The Aquarius Mine will resume production in January 1988. Test mining of 32 000 tons of ore was completed in 1984. Since that time, there was little activity underground, until 1987. The mill had been used as a custom facility. The custom milling of gold ore from Falconbridge Limited's Owl Creek Mine ceased on December 18, 1987. The mill will undergo a clean-up and the milling of Aquarius ore will begin January 4, 1988. At the end of 1987, 14 000 tons of ore was stockpiled on surface waiting for milling. This ore, originating from previously developed shrinkage stopes and from new development headings, was hoisted to surface.

Underground development to prepare for shrinkage stope production from gold zones, within the carbonatized ultramafic rocks, began in August, 1987. Exploratory drifting was done on the 500- foot level eastwards toward a gold-bearing siliceous zone. A total of 2400 feet of lateral underground development was done in 1987. Underground diamond drilling, beginning in November 1987, totalled 2500 feet. Surface drilling, done in the summer, totalled 2800 feet for four holes. At the end of 1987, drilling was in progress to delineate the south syenite zone and a mineralized shear zone adjacent to the syenite.

The Aquarius Mine is scheduled to produce 15 000 ounces of gold from 74 000 tons of ore in 1988. Milling is to be done at a rate of 300 tons per day, five days a week. Initially, all operating profit is to be used to pay off all the capital which has been spent thus far at the mine, and to pay for ongoing exploration and development at the property (Asarco Exploration Limited, personal communication, 1987).

Vedron Limited—Belmoral Mines Limited

Under an exploration and share purchase agreement, Belmoral Mines Limited has expended funds and earned a 56 percent interest in Vedron Limited. The funds were spent on the latter company's gold deposit in the south-central part of Tisdale Township.

Underground exploration was started on the deposit in June 1986, with Belmoral Mines Limited as the operator. The object of the program was to confirm reserves of more than 500 000 tons grading over 0.23 ounce gold per ton above the 500-foot level.

In 1987, the underground ramp was advanced 2790 feet to reach the 500-foot level. On the 275-foot level, 1160 feet of drifting was completed, 1350 feet on the 375-foot level, and 600 feet on the 500-foot level. A total of 875 feet of crosscutting was done on the 375- and 500-foot levels. A vent raise was driven 447 feet. Underground diamond drilling amounted to 19 000 feet, and 16 880 feet of surface diamond drilling was completed. Some of the surface diamond drilling was done on claims to the north of the Vedron Zone to explore for the extensions of the number 18 Vein, which was mined at depth on the adjoining eastern property by Paymaster Consolidated Gold Mines. A bulk sample of 4000 tons obtained from underground development was shipped to Belmoral's mill in Quebec.

A decision, with respect to continuing the ramp to 1000 feet and rehabilitating the old Buffalo Ankerite No. 5 Shaft, to gain access to the downward extension of the Vedron zone, will be made in early 1988. At the end of 1987, 61 people were employed at the Vedron project (Belmoral Mines Limited, news bulletin, November 1987; Assessment Files, Resident Geologist's Office, Timmins)

Belmoral Mines Limited—Broulan Resources Incorporated Joint Venture

Under the agreement between Belmoral Mines Limited and Broulan Resources Incorporated, Belmoral Mines Limited is committed to spend $2.5 million which will earn the company a 50 percent interest in properties in Timmins, held by Broulan Mines Limited.

The major objective of the Broulan project is to explore the area between the 2500-foot and the 5000-foot levels on the Pamour, Hallnor, and Broulan Break, in Whitney Township, as it extends across the Broulan Reef Mine property. By the end of 1987, a headframe was erected over the Reef Shaft, a hoist was installed, an ore bin constructed, and all surface facilities completed. The shaft was dewatered to the 1600-foot level and re-timbered to 1400 feet below surface. Dewatering will continue to the 2556-foot level (the shaft bottom). The shaft will be sunk an additional 1047 feet and a level is to be established at the 3400-foot elevation. Six thousand feet of eastward drifting is proposed at this elevation, to the Hallnor boundary. Diamond drilling will be done along the length of the drift.

Concurrent with the work of accessing the deeper levels, exploration is being done to prove 500 000 tons of gold ore above the 800-foot elevation in the "C" Zone. In 1987, 11 259 feet of surface diamond drilling was completed in this area. Twelve thousand feet of lateral underground development and 13 000 feet of underground diamond drilling are planned for 1988.

The total budget for this underground program at the Reef Shaft is $14.4 million over a period of two years.

At the end of 1987, there were 20 people employed on the project by Belmoral. The company had hired various contractors during the year for the surface installations (Belmoral Mines Limited, information brochure, November, 1987; personal communication, 1987).

Emerald Isle Resources—Kenty Gold Property

A surface exploration program, started late in 1986, continued through early 1987. Extensive stripping, trenching, mapping, and sampling of auriferous veins; collection of surface bulk samples; and a 28-hole diamond-drill program totalling 2950 m were completed. Twenty-one, gold-bearing, quartz-carbonate veins have been identified to date. A majority of the veins occurs between, and in, the immediate vicinity of two existing vertical shafts on the property. Two veins have been exposed up to 360 m down section from, and trending parallel to, the shaft zone veins. Stripping revealed two sets of mineralized veins, a dominant northeast-trending set and a subordinate north-south set.

Wall rock alteration is localized and characterized by microbrecciation, silicification, and pyritization of hydraulically rafted wall rock fragments, and locally, the development of complex quartz stockworks and breccias. The quartz veins are characterized by the presence of abundant, small (0.5 to 5.0 cm), mineralized wall rock fragments concentrated in the vein margins. Gold mineralization is erratically distributed, with the lowest values associated with pyrite, and progressively higher values associated with chalcopyrite, sphalerite, galena, and coarse native gold. The presence of base metal sulphides in the vein material is a reliable indication of good gold grades.

Fifty-three bulk samples from surface showings returned values ranging from less than 0.5 g/t to 40.6 g/t of gold. Due to the erratic nature of gold mineralization, it was concluded that diamond drilling is useful for outlining structure, but not reliable for use in sampling. One deep hole was drilled to test mineralization below the 525-foot level of the existing underground workings. A 6.4 m wide zone of mineralization averaging 2.1 g/t gold was reported. The use of the existing workings to test the economic potential of the vein systems has been approved by Emerald Isle Resources (George Cross Newsletter, December 10, 1986; The Northern Miner, June 15, 1987; Emerald Isle Resources, personal communication, 1987; D. Constable, Geological Consultant, personal communication, 1987).

Chesbar Resources Incorporated—Murgold Resources Incorporated

Chesbar Resources Incorporated (60 percent) and Murgold Resources Incorporated (40 percent) are joint venture partners on a 63-claim gold property in northeast Chester Township. Chesbar Resources Incorporated earned their 60 percent interest through the expenditure of $2 million on the property, plus a payment to Murgold Resources Incorporated of $200 000 in cash and shares. Chesbar Resources Incorporated is managing the exploration program. A decline ramp, started in late 1986, to test the No. 3 Vein System has advanced 3100 feet to a vertical depth of 400 feet. A total of 2200 feet of ramp advancement was completed in 1987. Lateral development was started on three levels in 1987. On the 150-foot level, 183 feet of crosscutting, 490 feet of drifting on the 3 and 3A Veins, and 40 feet of raising were done. On the 200-foot level, 498.5 feet of drifting on the No. 3 Vein, and 120 feet of raising were done; no crosscutting occurred on the 200-foot level, as the decline intersected the vein. On the 300-foot level, 121.5 feet of crosscutting, and 302 feet of drifting on the No. 3 vein were done. A total of 420 feet of drill bays and sumps were cut on the decline. Underground diamond drilling totalled 18 600 feet in 68 holes.

A two-phase, 90-hole surface diamond drilling program totalling 28 700 feet was completed in 1987. Drilling was concentrated on the No. 3, No. 1, and No. 8 Vein systems. The No. 3 Vein system, on which the underground exploration program is focused, has been traced for a strike length of 4000 feet and is open in both directions and at depth. Five subparallel gold-bearing quartz veins have been identified in the No. 3 Vein system. The No. 1 Vein system is located 1300 feet northeast of, and trends parallel to, the No. 3 Vein system. In 1987, the No. 1 zone was tested by diamond drilling above the 300-foot level over a 2100-foot strike length. It remains open at both ends and at depth. An initial interpretation of the drill results suggests the No. 1 Vein System is made up of multiple, narrow, subparallel, high grade quartz veins occurring in a major northwest-trending structure. The No. 8 Vein system is located approximately 1000 feet to the northwest, along strike, from the decline portal on the No. 3 Vein system. At year-end, diamond drilling was in progress to determine if the No. 8 Vein system is the westward extension of the No. 3 Vein system. This program is expected to continue into 1988. Preliminary results of drilling on the No. 8 Vein system indicate the presence of at least one high grade section which returned 0.8 ounce gold per ton over a 10-foot core length.

During the 1986 flow-through year, ending February 28, 1987, expenditures on the Chesbar/Murgold Property totalled $1.75 million. During the 1987 flow-through year, ending February 29, 1987, more than $2.77 million will have been committed to the property. Plans to drive a new ramp from the 275-foot level of the existing ramp have been approved. The new ramp will be driven approximately 1800 feet, to the 500-foot vertical level, and be used for diamond drilling the No. 3 Vein system, which has, to date, been defined to the 500-foot vertical level. Additional surface diamond drilling is also planned (Murgold Resources Incorporated, press releases, 1987; The Northern Miner, March 16, 23, May 4, June 29, July 6, November 23, 1987; George Cross Newsletter, June 29, July 23, 1987).

Stan West Mining Corporation, Canacord Resources Incorporated, Noranda Exploration Company Limited; Desantis Mine

The Desantis Mine in Ogden Township operated from 1939 to 1942, producing 196 928 tons of ore grading 0.18 ounce gold per ton. Stan West Mining Corporation funded a $1.5 million surface drilling program by Noranda Exploration Company Limited in 1985 and 1986, thereby earning an interest in the project. An underground development project was undertaken in late 1986 and early 1987, with a third joint venture partner, Canacord Resources Incorporated, funding the work and Stan West Mining Corporation operating. During this phase, a headframe was erected, the mine workings dewatered, and the shaft rehabilitated to the 1175-foot level, the bottom level of the mine. A crosscut on the 1175-foot level was extended 453 feet southward. Drilling (3033 feet) was done northward from the crosscut to evaluate both the albitite and the chert horizons. Definition drilling (3852 feet) was completed from old drifts on the 1050-foot level and on the 800-foot level. The project was postponed and the mine was allowed to flood. In August 1987, the mine was dewatered. The south crosscut on the 1175-foot level was advanced another 200 feet. By the end of 1987, a total of 200 feet of drifting eastward and 350 feet of drifting westward was completed. Another 50 feet of drifting westward is scheduled for January. The drifting is serving two purposes; to provide drilling stations to evaluate the albitite zone to the north between the 1175-foot level and the 2000-foot elevation and to drift along an arsenopyrite-gold-bearing quartz vein for sampling purposes. By the end of 1987, 6600 feet of definition drilling had been completed on the 1175-foot level (albitite zone); the 700-foot level (hydrothermal zone) and the 925-foot level (both the hydrothermal zone and the albitite zone). The total program will consist of 20 000 feet. By the end of 1987, 2100 feet of drilling had been completed from a scheduled 12 000-foot program from the 1175-foot level to outline the albitite zone (Stan West Mining Corporation, personal communication, 1987).

Novamin Incorporated (controlled by Breakwater Resources Limited)

Breakwater Resources Limited acquired a 77 percent undiluted interest in Novamin Incorporated in 1987. Novamin Incorporated owns 94.5 percent of the Rundle Gold Property in southeast Newton Township.

From 1985 to 1987, 85 surface holes totalling 20 848 m were drilled including 10 491 m in 24 holes drilled in 1987. Published drill-indicated reserves in all categories are 498 951.6 t (550 000 tons) at an average grade of 7.1 g/t gold (0.206 ounce per ton gold).

Novamin Incorporatd received $250 000 from the Northern Ontario Resource Transportation Committee, in 1987, towards the construction of a 16 km access road to the Rundle property. The company then began a two-phase underground exploration program consisting of a new decline ramp and rehabilitation and deepening of an existing 115 m two-compartment vertical shaft.

The decline ramp was advanced 893 m to a vertical depth of 122 m to provide access to two of the three known mineralized zones on the property. The ramp broke into the existing underground workings at the 46 m and 91 m levels. Drift development totalled 46 m on the 91 m level and 35 m on the 122 m level. Development of frill bays and remuck bays totalled 122 m.

3300 m of underground diamond drilling in over 100 holes was completed in 1987 as part of an ongoing program.

Following rehabilitation of the shaft collar, a new headframe was erected and a hoist house built. The shaft was deepened to 208 m from 115 m. (Novamin Resources Incorporated, personal communication, 1987; The Northern Miner, March 16, April 6, July 13, November 16, November 23, 1987; George Cross Newsletter, April 29, 1987; Canadian Mining Journal, January 1987)

Jerome Gold Mines Corporation–Muscocho Explorations Limited

Late in 1987, Jerome Gold Mines and Muscocho Exploration began camp construction at the Jerome Mines Property, a former gold producer located in Osway and Huffman Townships. The two companies are joint venture partners on an equal basis. Dewatering of the 347 m vertical shaft ; surface and underground diamond drilling on the Main and South Ore Zones ; bulk sampling of the already-defined ore blocks in the Main Zone and developing access to the South Zone from the existing underground workings are planned for 1988. The objective of the three-phase program is to increase the known ore reserves to 680 388.5 t (750 000 tons) grading 6.5 g/t (0.19 ounce per ton) gold. (Muscocho Explorations Limited, personal communication, 1987; Jerome Gold Mines Corporation, News Release, October 1987, Assessment Files, Resident Geologist's Office, Timmins).

Orofino Resources Limited

Orofino Resources completed a seven-hole, 915 m surface diamond drill program on their Swayze gold property in Silk and Horwood Townships. Four holes were drilled to test overburden depth and bedrock geology under the site of a proposed tailings disposal area. The other three holes were drilled to further define the deposit. One hole intersected the possible up-dip extension of the replacement zone obtaining gold values.

In 1987, Orofino Resources Limited received $125 800 from the Northern Ontario Resources Transportation Committee towards construction of a 10 km all-weather access road to the Swayze Deposit property. The road was completed in early September 1987. Late in 1987, Orofino began a $3.2 million underground exploration and development program on the property. A portal was located in the hanging wall of the No. 1 South Vein and a decline ramp was driven south towards the east extension of the vein. It cut through a non-economic section of the vein at a vertical depth of 42 m. Once in the footwall, the ramp was turned parallel to the vein and driven southwest to access the 45.72 m level of the existing underground workings. At the end of 1987, the ramp had reached the second level at a vertical depth of 84 m. Total ramp development was 700 m.

The decline will be extended a total of 762 m to a vertical depth of 119 m with a new, third level established at the 114 m elevation. Following completion of the ramp, Orofino will carry out a detailed underground drilling program and begin a program of stoping for bulk sampling purposes with the aim of confirming initial minable reserve estimates of 219 538.7 t (242 000 tons) grading 8.2 g/t gold (0.24 ounce per ton gold) within 122 m of surface. (Orofino Resources Limited, personal communication, 1987; The Northern Miner, October, 1987; The Financial Post, October 26, 1987; CIM Bulletin, November, 1987).

St. Andrew Goldfields Limited

In July 1987, St. Andrew Goldfields Limited announced that its Stock Township gold deposit will be brought into production at a cost of $15 million in late 1988. The company plans to build a 500 ton per day mill at the mine site.

Work on the deposit, in 1987, included 2157 feet of lateral underground development; 496 feet of vertical development and 23 091 feet of underground diamond drilling. Most of the work was done on the N-2 Zone. A 5000-ton bulk sample taken from 4 zones within the mine was sent to the Bachelor Lake Gold Mine in Quebec during July and August of 1987. Test results indicated that gold recovery was satisfactory and that the ore was without impurities. Grades obtained were comparable to chip and muck sample grades. Ore reserves at the mine are one million tons grading 0.196 ounce per ton gold.

St. Andrew did 3984 feet of surface diamond drilling on the East Zone in 1987. The Zone which lies 3000 feet east of the shaft was discovered in 1985. Esso Minerals Canada has a joint venture agreement with St. Andrew Goldfields on the property and managed the exploration program. Gold mineralization is within a carbonate-sericite altered tholeiite similar to the M-1 Zone within the mine workings.

Exploratory drilling, in a joint venture with Esso Minerals, was done on an area just to the west of the shaft to locate another horizon similar to the N-2 Zone. Favourable, carbonatized rocks were located and a narrow gold intersection was obtained in 1986. Surface diamond drilling totalling 4000 feet was done in 1987. (St. Andrew Goldfields, personal communication, 1987; The Globe and Mail, July 1, 1987)

Davidson Tisdale Mines Limited–Getty Resources Limited

On December 14, 1987, the joint venture partners announced that mining of gold ore will commence in January 1988, on the Davidson Tisdale Property in Tisdale Township. The minable reserves, which are above the 500-foot elevation, are 55 000 tons grading 0.23 ounce gold per ton. The ore will be stockpiled during the first three months and milled at Giant Yellowknife Limited's GOMILL custom facility. The initial production rate will be 200 tons per day. As well as mining the main zone, additional detailed underground exploration and development work will be done on the S-Zone. This zone received a limited amount of undergorund evaluation in 1987.

In late 1986, a third underground program was started with a decline ramp being driven from surface. A total of 863 feet of ramp was driven in 1986 and a further 2450 feet was driven, in 1987, to reach the 550-foot elevation. Another ramp, off the main ramp, was driven 1660 feet towards the S-Zone (Smith Vet Vein). Initially, it was driven down to the 328-foot elevation then up to the 246-foot elevation where the last 492 feet of the ramp was driven along the vein. A total of 1790 feet of lateral development (mostly sublevels) was done off the main ramp in the main zone in 1987. As well, 19 685 feet of underground drilling was done. In 1987, 7716 tons of ore were stockpiled, from underground development and slashing.

An extensive surface drilling program was also done on the property. A total of 11 732 feet in 29 holes was completed on the Main Zone in 1987. Drilling on the S-Zone totalled 33 455 feet in 81 holes. The Crown Charter Property, bordering the Davidson Tisdale Property to the east, was optioned from Esso Minerals Canada by the joint venture partners. Eleven holes, totalling 4144 feet, were completed on this property (Getty Resources Limited, personal communication, 1987).

Diepdaume Mines Limited

The underground workings at the Preston East Dome Gold Mine are being pumped out by Diepdaume Mines Limited. Only a minor amount of sampling was done underground. Diepdaume has constructed a 500 ton per day mill on site. The mill was operating periodically in late 1987. Minor problems still existed at the end of 1987, and continuous operation is scheduled for 1988. At the mill site, stockpiled and awaiting custom milling are 7000 tons of gold ore from the Monte Carlo Gold Mines Limited open cut in Chester Township and 6000 tons of open pit ore from the Duncan Gold Resources property in Tyrrell Township. Fifteen thousand tons of incinerator ash from Toronto, received in 1987, are also stockpiled at the mill site.

Diepdaume Mines Limited conducted two surface drill programs on the Preston East Dome property. Ten holes totalling 3060 feet were drilled on the extension of the Augdome gold zone as projected westward onto the Preston property. Two holes totalling 310 feet were drilled into a porphyry 600 feet northwest of the Preston No. 1 Shaft. A program of surface sampling was done on the company's staked claims south and adjacent to the Preston property in Deloro Township (Diepdaume Mines Limited, personal communication, 1987).

Victoria Porcupine Resources

Dewatering of the Naybob (Kenilworth) Mine in Ogden Township started in late 1987. A headframe will be erected and rehabilitating of the shaft will be done to the bottom of the mine (1275 feet below surface) in 1988. Five to ten thousand feet of underground diamond drilling will also be done from the bottom level of the mine. If results are positive, the shaft will be sunk another 500 feet.

In late 1987, 7500 feet of surface diamond drilling was done to evaluate the south sulphide zone on the property. An additional 8000 feet of drilling will be done in 1988 (David R. Bell Geological Services Incorporated, personal communication, 1987).

Wabigoon Resources Incorporated

Wabigoon Resources, and Master Resources and Developments Limited, entered into a joint venture agreement by which the latter company can earn a 50 percent interest in the Hunter Mine property in Whitney Township by purchasing shares in the former company and entering into a work committment on the property. The work will include underground development and underground diamond drilling. By the end of 1987, a headframe had been erected on the old inclined shaft (The Northern Miner, various articles, 1987).

Associated Porcupine Mines Limited

After completing the first phase of a three-phase exploration and development program on the Paymaster Mine property in Tisdale Township, Quill Resources terminated their agreement with Associated Porcupine Mines Limited. Quill Resources was to receive an interest in the property after funding all three phases; however, after financing 10 000 feet of surface diamond drilling in phase one at the end of 1986, the company decided to abandon the project in April 1987.

In December of 1987, Associated Porcupine Mines Limited made an agreement with American Reserve Mining Limited by which the latter company can earn 50 percent interest in the Paymaster property by financing a surface and underground evaluation program costing $15.2 million. Initially, $2.7 million will be spent for 33 000 feet of surface, deep hole diamond drilling. It is reported that there are 800 000 tons grading 0.227 ounce gold per ton to the 6025-foot level. An additional 141 000 tons grading 0.142 ounce per ton also have been reported (The Northern Miner, October 6, 1986, April 13, 1987, December 7, 1987).

Lucas Gold Resources Limited

Three holes totalling 2700 feet were drilled on the gold deposit in Lucas Township optioned by Lucas Gold Resources from Abitibi–Price Limited. Additional drilling is planned in 1988 (Lucas Gold Resources Limited, personal communication, 1987).

Canamax Resource Incorporated–Bruneau Mining Corporation, Clavos Gold Project

Since 1984, over 230 diamond drill holes have been drilled by the joint venture partners along strike of the Clavos Gold Deposit in German Township. In 1987, 73 three holes totalling 11 731 m were drilled.

To date, total drill-indicated reserves for the Clavos gold zone are 580 000 t grading 7.6 g/t gold using a cut-off of 3.5 g/t gold over two metres. By using a cut-off of 2.7 g/t gold over 2 m, reserves are

1.1 million tonnes grading 5.1 g/t gold. These reserve figures are uncut and undiluted.

The Clavos gold zone is a series of four gold deposits occurring at approximately 300 to 500 m intervals along the Pipeston Fault. Total strike length of the zone is 2000 m. By the end of 1987, all drilling had ceased on the property and all data had been transferred to Canamax Resources' mining department for a feasibility study (Canamax Resources, personal communication, 1987).

Noranda Exploration Company Limited

Noranda Exploration Company Limited and Golden Princess Mining Corporation have entered into an agreement by which Golden Princess will provide funding for exploration to earn one half of Noranda's 70 percent interest in the Nickel Offsets gold deposit in Tully Township. Noranda had previously made an agreement to obtain 70 percent of the property, with Canhorn Mining Corporation. The deposit contains an inferred mineral inventory of 650 000 tons grading 0.23 ounce gold per ton. Surface drilling on the property began in mid-1987, with 26 holes totalling 5200 m having been drilled to year-end. Drilling will continue in 1988. Two thirds of the holes were drilled to better define and extend the deposit. The other third were drilled on other targets on the property (G. Cross Newsletter, various articles, 1987; Noranda Exploration Company Limited, personal communication, 1987).

Pamorex Minerals Incorporated

Pamorex Minerals Incorporated, the exploration arm of Pamour Incorporated, began dewatering the Porcupine Peninsular Mine in Cody Township in late 1986. Underground mapping, sampling and diamond drilling totalling 13 300 feet were completed. The mine was allowed to flood in March 1987.

Pamorex blasted 25 000 tons on the surface of Pamour Incorporated's magnesite property in Deloro Township. A 1500-ton sample was hauled to Steetley Talc Limited's mill in Penhorwood Township for testing. The deposit is being assessed for both its talc and magnesite potential (Pamorex Minerals Incorporated, personal communication, 1987).

Augdome Corporation

Six thousand feet of surface diamond drilling was done by Augdome Corporation, in early 1987, to test the company's gold deposit at depth. The property is located southeast of and adjacent to the Dome Mine in Tisdale Township. Drill-inferred reserves are 140 000 tons grading 0.10 ounce gold per ton, within altered ultramafics rocks.

Four thousand feet of additional diamond drilling were completed by Augdome, in late 1987, to test an iron formation which lies along ultramafic rocks, for gold mineralization. Line cutting, geological mapping, geophysical surveying, and trenching and stripping in selected areas were also done (Augdome Corporation, personal communication, 1987).

SWAYZE BELT EXPLORATION ACTIVITY

Esso Minerals Canada

A program of line cutting, prospecting, geological mapping and lithogeochemical sampling was carried out over the major portion of Esso's 121 unpatented claim group in northeastern Heenan Township and northwestern Marion Township. The area is underlain by Mg-tholeiitic metavolcanics with intercalated Fe-tholeiitic and komatiitic flows and large gabbroic intrusions at the western end. Low but anomalous gold values were obtained from a silica-carbonate altered mafic metavolcanic sequence in northeast Heenan Township containing quartz-carbonate veining and disseminated pyrite. Additional work has been recommended (Esso Minerals Canada, personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

St. Joe Canada Inc.–Giant Bay Resources Limited

St. Joe Canada Inc. staked 37 claims on the west side of Horwood Lake, Horwood Township, in 1987, covering the former O'Neil Gold Prospecting Syndicate occurrences on Pinecone Point. The gold showings, discovered in 1933, consist of two parallel, northwest-trending shear zones approximately 365 m apart which are carbonatized, sericitized and contain disseminated pyrite and narrow quartz tourmaline veins. The southern or "A" zone has been exposed across a width of 15 m and length of 30 m. The northern or "B" Zone is poorly exposed in a series of old transecting trenches along strike for 20 m. Diamond drilling is scheduled following freeze up (St. Joe Canada Inc., personal communication, 1987; George Cross Newsletter, Nov. 23, 1987).

Dome Exploration (Canada) Limited

Dome Exploration has an 80 percent interest (Algoma-Talisman Minerals Limited—20 percent) in the mineral rights to 65 km^2 of patented ground in central Newton Township and northeastern Coppell Township. Line cutting, detailed ground geophysical surveys and geological mapping were carried out over the northwestern portion of the property in 1987. A 3050 m diamond-drill program is scheduled for the 1987–1988 winter season to test targets outlined during their 1986 and 1987 exploration programs (Dome Exploration Canada Limited, 1987, personal communications).

Noranda Exploration Company Limited–Anglo-Porcupine Gold Mines Ltd.

Noranda Exploration Company Limited (55 percent) and Anglo-Porcupine Gold Mines Ltd. (45 percent) are joint venture partners in two properties totalling 46 claims on Horwood Lake, Horwood Township. At the end of 1987, the joint venture partners were staking between the two properties. During 1987, Noranda conducted a trenching and sampling program on three areas. The most promising areas are on the Labbe showings discovered on the northwestern shore of Hardiman Bay in 1936. Channel sampling by Noranda on the No. 1 and No. 2 zones returned values as high as 24.0 g/t gold across 0.5 m. Values up to 3.5 g/t gold across 1.0 m were obtained on a

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 10.4

Number on Figure	Individual or Company		Activity
1.	546577 Ontario Inc.	Turnbull	Magnetic, horizontal loop electromagnetic and induced polarization surveys
2.	652422 Ontario Inc.	Silk, Horwood	Geophysical surveys
3.	655 Group Holdings	Turnbull, Carscallen	Geological survey
4.	Agassiz Resources Ltd.	Macklem	Magnetic and very low frequency electromagnetic surveys
5.	R. Allerston/Camden Resources	Stock	Magnetic survey
6.	Allerston & Sutherland	Whitney	Geological, magnetic and very low frequency electromagnetic surveys
7.	Artax Exploration Services	Penhorwood	Geophysical surveys
8.	Asarco Exploration	Macklem	Diamond drilling
		Matheson, Fallon	Reverse circulation drilling
9.	Aslan Expln./Dev.	Robb, Jamieson	Geological and very low frequency electromagnetic surveys
10.	Astralla Resources	Fergus	Linecutting, geological, geochemical, magnetic and very low frequency electromagnetic surveys
11.	Armand Aube	Deloro	Magnetic survey
12.	Bankers Petroleum Limited	Turnbull, Godfrey	Linecutting, trenching, sampling and geological survey
13.	B.A. Resources	Thomas	Geological and magnetic surveys
14.	B.H.P. Utah Mines	Penhorwood	Diamond drilling
		Keith, Muskego	Induced polarization survey
15.	E.J. Blanchard	Chester	Diamond drilling
		Denyes	Airborne magnetic and very low frequency electromagnetic surveys
16.	Blue Falcon Mines	Benton, Mallard	Geological survey
17.	Blue Falcon/Kidd Resources	Chester, Yeo	Geological survey
18.	Blue Falcon/Daimler Resources	Marion	Geological survey
19.	Gerald Boissonneault	Matheson	Stripping
20.	Bongold Mining Limited	Mountjoy, Jessop, Jamieson, Godfrey	Diamond drilling
21.	B.P. Resources, Selco Div.	Keith, Muskego	Airborne magnetic and electromagnetic surveys; induced polarization survey; trenching
22.	Brown-McDade	Shaw	Geological and induced polarization surveys
23.	Bruneau Mining Corp.	Clergue	Diamond drilling
24.	Isaac Burns	Chester	Diamond drilling
25.	Canadian Gold Res./Monte Carlo/ Lyndex Explorations	Chester	Bulk sampling and diamond drilling
26.	Canadian Nickel Co.	Eldorado, Langmuir	Reverse circulation drilling
27.	Cane Corporation	Mallard	Exploration program
28.	Canper Res./Gallager Res./ Goldhunter Explorations	Hoyle, Gowan	Reverse circulation drilling
29.	Carlson Mines	Kipling	Airborne magnetic and electromagnetic surveys
30.	Chesbar Resources Inc.	Yeo	Linecutting, geological and geophysical surveys
31.	Chevron Canada Resources Ltd.	Bristol	Diamond drilling; airborne very low frequency electromagnetic survey
		Price	Geological survey and sampling
		Price, German, Thorneloe	Airborne magnetic and very low frequency electromagnetic surveys
32.	Ed Colbert	Denton	Diamond drilling
33.	Cominco Limited	German	Reverse circulation and diamond drilling
		Evelyn, Bristol, Shaw	Diamond drilling
		Whitney	Stripping, trenching and bulk sampling

TABLE 10.4 Continued

Number on Figure	Individual or Company		Activity
34.	Comstate Resources Limited	Cody, Reeves	Geological survey
		McCowan	Stripping, sampling and geological survey
		Wark, Murphy	Geological and electromagnetic surveys
35.	Consolidated Silver Butte Mines	Potier, Yeo, Benneweis	Stripping and trenching
		Chester, Groves	Geological, geochemical and very low frequency electromagnetic surveys; stripping and trenching
36.	Consolidated Thompson-Lundmark	Tisdale	Linecutting, diamond and reverse circulation drilling and geophysical surveys
37.	Delbridge Mines Limited	Turnbull	Trenching, diamond drilling and geophysical surveys
38.	J. Denttinen	Casselman	Very low frequency electromagnetic survey
39.	Diepdaume Mines Limited	Cody	Diamond drilling
40.	Dome Expln. (Can.) Ltd.	Newton, Coppell	Linecutting, geophysical and geological surveys
41.	Eldor Resources Limited	Deloro	Sampling and geological survey
		Rykert	Airborne magnetic and very low frequency electromagnetic surveys
42.	B.A. Ellies	Tisdale	Trenching and sampling
43.	Emerald Isle Resources	Chester	Diamond drilling
		Swayze	Airborne magnetic and very low frequency electromagnetic surveys
44.	Esso Minerals (Canada) Ltd.	Heenan, Marion	Linecutting, prospecting, geological and lithogeochemical surveys
		Tully	Diamond drilling
		Zavitz	Geological and geochemical surveys
45.	Esso Minerals/Torogold Res.	Bristol, Thorneloe	Diamond drilling
46.	Falconbridge Limited	Clergue, Cody, Godfrey, Hoyle, Jamieson, Kidd, Lucas, Mahaffy, Matheson, Prosser, Reid, Tisdale, Whitney	Diamond drilling
		Prosser, Macklem	Reverse circulation drilling
		Prosser	Airborne magnetic, electromagnetic and very low frequency electromagnetic surveys
47.	Findore Minerals	Shaw, Deloro	Magnetic and very low frequency electromagnetic surveys
48.	Gadzala & McLean	Douglas	Geological survey
49.	Galata & Zoebelein	Keefer	Magnetic and very low frequency electromagnetic surveys
50.	Glen Auden Resources	Lower Detour Lake	Geophysical surveys
51.	Glen Auden Res./Can-Mac Expln.	Denyes	Geological and magnetic surveys; sampling
		Swayze, Denyes	Diamond drilling, geological, magnetic, electromagnetic and geochemical surveys
52.	Glen Auden Res./Goldrock Res.	Reeves, Sewell, Kenogaming, Penhorwood	Geological, geochemical and geophysical surveys; stripping and trenching
		Raney	Geochemical, magnetic and horizontal loop electromagnetic surveys
53.	Glen Roy Resources	Chester	Diamond drilling
54.	Golden Pheasant	Carman, Langmuir	Geological and magnetic surveys
55.	Golden Trio Minerals Limited	Ecclestone, Fergus, Parnell, Opasatika, Caithness, Rykert, Abbott, Templeton, Pelletier, Roche, Scholfield, Legge, Marjorie, Minnipuka, Walls	Airborne magnetic and very low frequency electromagnetic surveys
		Ecclestone, Fergus, Opasatika	Diamond and overburden drilling; geological survey

TABLE 10.4 Continued

Number on Figure	Individual or Company		Activity
56.	Gold Fields Canadian Mining Ltd.	Tisdale	Linecutting, diamond drilling; geological survey
57.	Goldhurst Resources Limited	Turnbull	Geological and geophysical surveys; diamond drilling
58.	Goldrock Resources	Raney	Magnetic and electromagnetic surveys
59.	Gowest Amalgamated/Jonpol Expln.	Denton	Diamond drilling
60.	Grandad Resources Ltd.	Esther	Diamond drilling
61.	Gyro Capital Inc.	Shaw, Ogden	Exploration program
62.	Halex Resources	Heenan, Marion, Genoa	Linecutting, prospecting
63.	Fred Harvey	Deloro	Trenching
64.	Highwood Resources Limited	Bristol	Diamond drilling
65.	Len Hill	Mann	Prospecting
66.	Honcho Gold Mines Limited	Bristol	Diamond drilling and geophysical surveys
67.	HSK Minerals Limited	English, Beemer	Diamond drilling
68.	Imperial Platinum Corp.	Reaume, Mann, Hanna, Duff	Magnetic and electromagnetic surveys
69.	Jarvis Resources	Swayze	Airborne magnetic and very low frequency electromagnetic surveys
70.	Kaphearst Resources Corp.	Scholfield	Airborne magnetic and electromagnetic surveys
		Caithness, Roche, Franz, Scholfield, Talbott, Ebbs	Overburden drilling, geological and geophysical surveys
71.	Kenty Exploration Limited	Rollo	Geophysical surveys
72.	Kidd Creek Mines	Clergue	Geological survey
73.	Lac Minerals Limited	Langmuir, Fallon, Sheraton, Clergue	Geological and geophysical surveys
74.	Legion Resources Limited	Robb	Diamond drilling
75.	Lithium Corporation of Canada	Whitney	Diamond drilling
76.	Manville Canada	Penhorwood	Geological, magnetic, electromagnetic and radiometric surveys
77.	Marshall Minerals/Gail Resources	Keith	Magnetic, very low frequency electromagnetic and induced polarization surveys; airborne magnetic and electromagnetic surveys; stripping; geological survey; sampling
78.	A. Maskevich	Keith	Linecutting and geophysical surveys
79.	Maurex Resources Limited	Walls	Very low frequency electromagnetic survey
80.	David Meunier	Carman	Prospecting
81.	Meunier & Sutherland	Jessop	Geological survey
82.	Mill City Gold Inc.	Deloro	Diamond drilling, geological and geochemical surveys
83.	Moneta Porcupine Mines	Whitney	Magnetic and electromagnetic surveys
		Tisdale	Trenching and reverse circulation drilling
		Tisdale, Murphy	Diamond drilling
		Murphy	Magnetic and very low frequency electromagnetic surveys
		Hoyle	Magnetic and electromagnetic surveys
84.	Monte Carlo G.M.L./Colray Res.	Marion	Linecutting; geological survey
85.	Doug Moorish	Fallon	Prospecting
86.	Eero Mord	Matheson	Very low frequency electromagnetic survey
87.	D. Morin/F. Ross	Penhorwood	Prospecting, trenching, stripping and sampling
88.	Murgold Resources	Chester, Benneweis, Groves	Linecutting, diamond drilling; geophysical surveys
89.	Musto Explorations Limited	Collins, Chewett	Land surveying, aerial photography and airborne geophysical surveys
90.	Newmont Exploration	Denton	Diamond drilling; geological and electromagnetic surveys

TABLE 10.4 Continued

Number on Figure	Individual or Company		Activity
91.	Noranda Exploration	Mann, Little, Stock, Mountjoy	Diamond drilling
		Reeves	Airborne magnetic and electromagnetic surveys
		Matheson	Geological, magnetic and electromagnetic surveys
		Stock	Geochemical surveys
		Ogden	Geological and electromagnetic surveys
		Lower Detour Lake	Magnetic and electromagnetic surveys
92.	Noranda Expln./Anglo Porcupine	Horwood	Trenching and sampling
93.	Noranda Expln./McChip Res.	Macklem	Diamond drilling, magnetic and electromagnetic surveys
94.	Northern Resources Inc.	Swayze, Dore, Garnet, Ivanhoe	Trenching, stripping and prospecting
95.	Odyssey Explorations	Chester	Geological and geophysical surveys; sampling
96.	Orofino Resources	Horwood	Radiometric and geochemical surveys
		Penhorwood	Geological survey
97.	Pamorex Minerals Inc.	Cody, Macklem	Diamond and reverse circulation drilling
		Jessop, Murphy, Mountjoy	Overburden drilling
		Matheson	Diamond and reverse circulation drilling; geophysical surveys
		Semple	Stripping; diamond drilling; magnetic and electromagnetic surveys
		Tisdale	Diamond and overburden drilling
98.	Pelangio-Larder/Bayridge Dev.	Horwood	Geological, magnetic and very low frequency electromagnetic surveys
99.	Placer Dome Inc.	Bristol	Diamond drilling
		Blackstock, Langmuir	Sonic overburden drilling
		English, Semple, Langmuir	Magnetic and electromagnetic surveys
		English, Sothman	Geological and magnetic surveys
		Lower Detour Lake	Diamond drilling
		Nursey	Magnetic survey
		Sheraton	Linecutting; magnetic and electromagnetic surveys
		Thomas	Prospecting; trenching; geological, magnetic and electromagnetic surveys
100.	Porcupine Balmoral Resources	Adams	Diamond drilling
101.	Priority Metals and Minerals	Whitney	Diamond drilling
102.	M. Puddester	Whitney	Magnetic survey
103.	Quinterra Resources Ltd.	Tooms, Greenlaw, Halcrow	Diamond drilling
104.	Quinterra Res./Golden Rim Res.	Swayze, Cunningham	Diamond drilling
105.	Quote Resources/Shoreacres Expln.	Sothman	Stripping
106.	Raretech Minerals	Swayze	Airborne magnetic and very low frequency electromagnetic surveys
107.	Regal Petroleum Limited	Halcrow	Diamond drilling
108.	Seeley Lake Resources Inc.	Shaw	Stripping and trenching
109.	J.P. Sheridan	Whitney	Magnetic and electromagnetic surveys
		German	Electromagnetic survey
		Cody	Assaying
		Deloro	Geological and magnetic survey
		Tisdale	Magnetic survey; assaying
110.	St. Joe Canada/Giant Bay Res.	Horwood	Diamond drilling
111.	Herve St. Louis	Doherty	Airborne magnetic and very low frequency electromagnetic surveys
112.	Stockgold Resources Limited	Stock	Overburden drilling; magnetic survey
113.	Syngold Exploration	Whitney	Magnetic and induced polarization surveys
114.	Teck Corporation	Penhorwood	Exploration program
115.	Tri-Con Resources Limited	Matheson	Exploration program
116.	Tyranex Gold	Deloro, Shaw	Magnetic survey

TABLE 10.4 Continued

Number on Figure	Individual or Company		Activity
117.	Unigold Resources Ltd.	Muskego, Keith, Reeves, Penhorwood	Diamond drilling
		Bond, Sheraton	Diamond drilling
118.	United Kingdom Energy Inc.	McArthur	Diamond and reverse circulation drilling
119.	Ventex Energy	Blackstock, Thomas, Carman, Sheraton	Magnetic, horizontal loop electromagnetic and induced polarization surveys
120.	Vital Pacific Resources	Tisdale	Diamond drilling
121.	Westmin Resources Limited	Sunday Lake	Diamond drilling
		Lower Detour Lake	Magnetic, very low frequency and horizontal loop electromagnetic surveys
122.	Young-Shannon G.M.L./ Chester Minerals	Chester	Diamond drilling, trenching, stripping and sampling

second area, the West Point showings. Diamond drilling is planned, pending the results of the trenching program (Noranda Exploration Company Limited, personal communication, 1987; The Northern Miner, Nov. 16, 1987).

Marshall Minerals Corp.—Gall Resources Inc.

Marshall Minerals Corp. (55 percent) and Gall Resources Inc. (45 percent) continued a major exploration program on their 205-claim Sangold Project property in Keith Township. Previous work by Gall Resources had identified two gold occurrences and one base metal occurrence in the south part of the property. In March and April, 1987, ground magnetic and VLF-EM surveys over a detailed test grid were completed. A detailed grid was then established on another 20 claims covering the main showing on the property. In early May, 1987, a 435-line-kilometre, helicopter-borne geophysical survey was flown over the entire Sangold Project property. At the same time, stripping began on a VLF-EM target outlined during the initial ground survey. A third zone of gold mineralization was subsequently discovered in a highly sheared, carbonatized and sericitized felsic rock. Gold values up to 17.8 g/t were obtained from small, isolated, northwest-trending, pyrite stringers associated with narrow quartz-albite-carbonate veins. Mineralization is erratic where exposed, and Marshall Minerals plans to test the zone further along strike.

Much of the previous work was carried out on the former Hoodoo Lake Gold Mines showing. Extensive stripping and sampling had been done on the zone which consists of a north-trending, 0.2 to 1.0 m wide, massive, quartz-carbonate vein containing abundant semi-massive pyrite pods and stringers. The vein is high grade (assays up to 400 g/t gold) but is only 20 m long, being faulted off at both ends. The faults parallel a pervasive northwest-trending, zone of highly ductile shearing and foliation that affects all rock types with the exception of a narrow lamprophyre dike occupying one of the northwest-trending faults.

In 1987, a small section at the northern end of the area, stripped in 1985 and 1986, was cleaned to examine the site of several, mineralized, quartz vein fragments found at the end of the 1986 exploration program. Stripping revealed a pyrite mineralized, gold-bearing, quartz-carbonate vein and stringer zone varying in width from 0.3 m to over 9 m. An additional area 75 m long by 45 m wide was stripped on this new zone. Detailed mapping and channel sampling has been completed. Gold mineralization is associated with multiple quartz-carbonate veins occupying a high-strain, north- to northwest-trending ductile shear zone at least 50 m wide. The veins are intensely deformed with local isoclinal and recumbent drag-folded sections. Gold values are concentrated in the noses of the folds. Subsequent brittle deformation has caused some minor dislocation of individual veins within the shear zone.

Ground magnetic, VLF-EM and IP surveys have begun on the existing grid and initial results of the IP survey indicate the zone is traceable for over 915 m along strike. Interpretation of airborne geophysical data has outlined several exploration targets on the property (Marshall Minerals Corp., Gall Resources Inc., 1987, personal communication, 1987).

Pelangio-Larder Mines Ltd.—Bayridge Developments Inc.

Pelangio-Larder Mines did a preliminary exploration program on a part of a 51-claim gold property in Horwood Township. The claim blocks are on the eastern shore of Horwood Lake and include the Blueberry Island and Stack Vein showings. Ground geophysical and geological surveys were done. Old pits and trenches were examined. Three zones of gold mineralization were located. The Stack Vein zone is exposed intermittently in old trenches, pits and outcrop over a strike length of 420 m. The zone width is unknown. Within the trenches and pits, a number of parallel, narrow, northwest-trending shear zones occur in foliated mafic metavolcanics and fine-grained gabbroic to dioritic rocks. Within the narrow shears, discontinuous quartz-sulphide veins, lenses and veinlets occur. The altered wall rock within the shears is highly carbonatized, sericitized to chloritized and locally silicified. Disseminated to semi-massive pyrite, pyrrhotite and minor chalcopyrite occur locally within the shears and quartz veins. Massive pyrite stringers also occur in the shears. Gold values are erratically distributed within the shears and concentrated in the quartz veins. Gold values up to 30 g/t have been reported from the initial sampling program on the Stack Vein Zone.

A second zone of gold mineralization occurs 1100 m southwest of the Stack Vein Zone, near the eastern shore of Horwood Lake. Two parallel, northwest-trending quartz veins averaging 0.15 m wide, about 20 m apart, have been exposed in trenches and pits along strike for approximately 60 m. The quartz veins are enclosed in silicified, aphanitic, mylonitic wall rock. The veins contain pyrite and chalcopyrite and assay up to 25.0 g/t gold and 0.36 percent copper.

A third gold zone is situated 500 m south of the second zone. A northwest-trending quartz vein containing less than one percent pyrite and chalcopyrite is partially exposed in a sequence of chlorite-carbonate-sericite schists. This sequence is at least 10 m wide and is mineralized with pyrite, chalcopyrite, minor sphalerite and hematite. Values up to 2.8 g/t gold were obtained from the quartz vein.

A fourth mineralized zone is known to occur on the property, beneath Horwood Lake. Diamond drilling by Kerr Addison Gold Mines Limited, in 1960, outlined a series of easterly-trending, steeply dipping, narrow quartz-carbonate veins and stringers mineralized with variable amounts of pyrrhotite, chalcopyirte, pyrite and gold. This zone was delineated over a 76 m length to a depth of 45 m. Values of 14.6 g/t gold and 118.3 g/t gold were reported over narrow widths of between 10.2 cm and 51.8 cm.

Pelangio-Larder Mines plans detailed IP surveys over the known zones following freeze up, with diamond drilling to follow. Bayview Developments Inc. is earning a percentage of the Horwood property through expenditures on the property (Pelangio-Larder Mines Ltd., personal communication, 1987).

B.P. Resources Canada Limited, Selco Division

BP Resources flew a 235-line-kilometre, helicopter-borne geophysical survey over their 170 claims in Keith and Muskego Townships. A follow-up ground program of reconnaissance IP surveys over VLF-EM anomalies, and backhoe trenching,was also carried out. Preliminary results were inconclusive due to deep overburden cover. Additional work is planned (B.P. Resources Canada Limited, Selco Division, personal communication, 1987).

Monte Carlo Gold Mines Limited–Colray Resources Inc.

Line cutting, prospecting and geological mapping were done on a group of 81 unpatented claims in southeastern Marion Township. Several areas within the claim block contain quartz-carbonate-pyrite-chalcopyrite veining associated with northwest-trending shear zones in a granite-granodiorite hybrid intrusive complex. Detailed follow-up of the mineralized zones has been recommended (G. Cross Newsletter, June 17, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Young-Shannon Gold Mines Limited–Chester Minerals Limited

In early 1987, a 30-hole surface diamond-drilling program totalling 3166 m to test five gold zones located in north-central and northwestern Chester Township was completed. Three mineralized zones are located on the Young-Shannon Gold Mines Limited (75 percent)–Northquest Ventures (25 percent) property on Three Duck Lake. On the "A" Zone, which covers the original Gosselin showing, 655.6 m, in seven holes, were drilled. Values ranging from 2.6 g/t gold over 1.22 m to 126.88 g/t gold over 0.61 m were reported. A total of 321.8 m, in five holes, was drilled on the "B" Zone, located on the northwestern shore of Three Duck Lake. Significant mineralization was reported from two holes, with the best intersection being 17.9 g/t gold over 1.37 m. The "C" or Young-Shannon Shaft Zone is the most extensively explored gold prospect on the property. Limited underground development was carried out, in 1978, by Canadian Gold Crest Limited and a 63.5 t per day flotation mill was erected. No production was reported. In 1987, eight holes totalling 1042.7 m were drilled, to test the zone below the 30 m level along a 180 m strike length. All holes drilled reported gold mineralization over narrow (0.15 to 2.1 m) widths and several holes intersected multiple zones of mineralization. The best intersection was obtained at a vertical depth of 90.4 m directly beneath the shaft. An average assay of 44.8 g/t gold over 4.8 m was obtained in five narrow intersections.

Two zones located on two claim groups held by Chester Minerals Limited were diamond drilled as part of the total program. The "D" Zone, located on the northwestern shore of Middle Three Duck Lake, was tested with three holes totalling 463.3 m. Significant gold mineralization over narrow widths (4.5 g/t gold over 0.6 m to 11.3 g/t gold over 0.3 m) was noted in two holes. The "F" Zone is exposed at surface on Shannon Island in Clam Lake. Seven drill holes were completed totalling 679.7 m on the "F" Zone. Mineralized intersections ranging from 2.1 g/t over 1.0 m to 19.2 g/t over 0.3 m were obtained in four of the holes.

In August, 1987, a second phase of exploration consisting of trenching and sampling, and an additional 1526 m of diamond drilling was done. Young-Shannon Gold Mines diamond drilled ten additional holes totalling approximately 900 m, to test the continued eastward extension of the Young-Shannon Shaft Zone. The mineralized gold-bearing zone has now been traced northeast along strike for 400 m.

On the "B" Zone, three holes totalling 197 m were drilled to test the faulted, western extension of the previously drilled section. Recent stripping found the western extension of the "B" zone had been displaced to the south approximately 100 m.

Three holes totalling 429 m were drilled on the "A" Zone to test the continuity at depth of gold mineralization. Logging and sampling of drill core was still in progress at year end (The Northern Miner, June 15, 1987; Young-Shannon Gold Mines Limited, personal communication, 1987).

Glen Auden Resources Limited–Goldrock Resources Inc.

Glen Auden Resources and Goldrock Resources are joint venture partners on two properties in the Swayze area. The Reeves Joint Venture Property is a block of 350 unpatented claims at the common corner of Reeves, Sewell, Kenogaming and Penhorwood Townships. In 1987, an exploration program consisting of prospecting, geological mapping, stripping, trenching, geochemical sampling and ground geophysical surveys was completed on the property. New gridlines are being cut and detailed ground geophysical surveys carried out on selected targets within the group, to follow up soil, till and bedrock gold anomalies.

Glen Auden Resources and Goldrock Resources are forming a new company, called Raney Minerals Inc., to manage the 72-claim J-Dex Option property in south-central Raney Township. In 1987, grid lines were re-established and a program of ground geophysics and rock geochemistry was carried out on portions of the property. Additional IP surveys are scheduled. The main focus of the ongoing exploration program is the original Throne-Greaser gold occurrence where J-Dex Mining and Exploration Limited previously reported a drill intersection of 5.75 g/t gold over 1.14 m (R.S. Middleton Exploration Services Inc., personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Glen Auden Resources/Can-Mac Exploration Ltd.

Glen Auden Resources and Can-Mac Exploration are joint venture partners on three properties.

The Saxton Lake Property consists of 32 unpatented claims in central Swayze Township. During 1987, line cutting, ground geophysics, geological mapping and lithogeochemical sampling were completed on the property. Several geophysical and geochemical anomalies were identified.

The Swayze Lake Group is 39 unpatented, contiguous claims straddling the boundary between northwestern Swayze Township and northeastern Denyes Township. In 1986, a geological survey confirmed two gold-bearing zones in the vicinity of the Derraugh Occurrence. In 1987, grid lines were cut on the western part of the claim group. Ground geophysical, detailed geological mapping, and lithogeochemical surveys were completed. A surface diamond-drill program was started, to test the two showings at depth. A total of 365.7 m was drilled in four holes on the north zone. The main Derraugh showing has yet to be drilled tested.

The Sylvanite Property consists of six unpatented claims located in west-central Denyes Township, 2.4 km north of Sylvanite Lake. The property covers the Sylvanite Gold Mines Limited showings. Geological mapping and sampling were completed over the showings in 1986. In 1987, ground geophysical surveys, geological mapping and sampling were completed on the property.

Late in 1987, Can-Mac Exploration assumed management of the exploration programs on the three properties. A field camp has been established and preparations have been made to start a power stripping, trenching, and detailed sampling program on the Saxton Lake and Swayze Lake Properties. Additional diamond drilling is planned, pending the results of the trenching program (Glen Auden Resources Limited, press release, October 1, 1987; Glen Auden Resources Limited, personal communication, 1987).

Regal Petroleum Limited

A ten-hole diamond-drill program totalling 2130 m was completed on Regal Petroleum Limited's Halcrow–Swayze gold property in west-central Halcrow Township. Drilling began, late in 1986, to test results of the 1985 drill program on the shaft zone of the Halcrow-Swayze Gold Mine. Five deep holes totalling 1389.3 m confirmed wide zones of sub-economic, low grade gold mineralization. Three geophysical anomalies, not in the shaft area, were also drilled to a total of 740.7 m in five holes. No economic mineralization was found. Diamond drilling to date has tested a 750 m long mineralized portion of a structure that has been traced for over 4.0 km. Several geophysical targets remain to be tested (George Cross Newsletter, Nov. 8, 1986; Orequest Consultants Limited, for Regal Petroleum Limited, personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

B.H.P. Utah Mines (Exploration) Limited

B.H.P. Utah Mines explored three properties in 1987. Four holes totalling 655 m were drilled on the Karvinen Option property in eastern Penhorwood Township. Drill targets were IP chargeability anomalies. Anomalous, sub-economic gold values were intersected in a hole drilled to test the eastern end of an 850 m long IP anomaly. The gold values occur in a distinct zone of carbonatization and silicification containing 3 to 5 percent pyrite within silicified mafic flows. Additional diamond drilling has been recommended.

A two-hole, 395 m diamond-drill program was completed on the Dunlop (Bromley Patents) Option in central Penhorwood Township. The property consists of four patented claims on which several small Au-Ag-Cu-Pb-Zn occurrences have been documented. Drill targets were geophysical anomalies associated with a quartz stockwork system containing isolated pods and lenses of high-grade zinc-lead-silver, and erratic gold values. The quartz stockworks are confined to a 10 m wide, fault-bounded contact zone between carbonatized, foliated ultramafic flows and feldspar porphyry intrusions. No significant mineralized sections were reported. The option has since lapsed.

The Boulder Lake property consists of 67 unpatented mining claims in Muskego and Keith Townships. During 1987, B.H.P. Utah completed detailed IP surveys over the southwestern part of the claim group to delineate the southwestward extension of the mineralized horizon encountered during their 1986 diamond-drill program. A similar survey was carried out over the northwestern part of the claim group, to define a conductive horizon south of and, trending parallel to, the intrusive contact between the Boulder Lake batholith to the north and the volcano-sedimentary sequence to the south. Diamond drilling is scheduled to begin early in 1988. Orvana Resources Inc. has the option to buy into the property as a joint venture partner by financing the drill program (B.H.P. Utah Mines (Exploration) Limited, personal communication, 1987)

Halex Resources Ltd.

Halex Resources has optioned a large block of claims in Heenan, Marion and Genoa Townships, from Falconbridge Limited. The claims cover much of the northeast-trending Woman River iron formation which is known to host several base metal occurrences and a gold occurrence. Gold values were obtained by Falconbridge Limited in three holes drilled between 1980 and 1984, on two claims located east of Claim Lake in Heenan Township. Values including 8.6 g/t gold over 3.07 m; 5.3 g/t gold over 3.35 m and 3.8 g/t gold over 9.3 m (including 7.6 g/t gold over 1.0 m) were reported. Exploration by Halex Resources late in 1987, consisted of approximately 80 km of line cutting and some prospecting. Detailed ground geophysics and a 2000 m diamond-drill program are scheduled following freeze up (The Northern Miner Press, June 29, 1987; Halex Resources Inc., personal communication, 1987).

Quinterra Resources Inc.

Late in 1987, Quinterra Resources completed an eleven hole diamond-drill program totalling 1640 m on their 270 unpatented claim Sylvanite Creek property in Tooms, Greenlaw and Halcrow Townships. The purpose of the drilling program was to explore basal till gold anomalies associated with two parallel, northwest-trending, green charbonate-silica alteration zones that have been traced for several kilometres through the property. The alteration zones are roughly stratiform, occurring within a transitional sequence of ultramafic to intermediate tuffs, siliceous to cherty chemical sediments and random, mafic to ultramafic flows that have been intruded by feldspar (quartz) porphyry dikes and ultramafic dikes that have been largely altered to carbonate and magnesite. Significant gold mineralization over narrow widths was reported in two of seven holes for which results are available.

Hole SC-87-4, drilled southeast of Betty Lake in northwestern Tooms Township, returned 4.28 g/t gold over 2.65 m, 4.9 g/t gold over 0.7 m and 2.9 g/t gold over 1.83 m. Drill hole SC-87-5, drilled approximately 2.0 km southeast along trend from hole SC-87-4, was collared in mineralization which returned 3.55 g/t gold over the first 1.37 m of core; 2.83 g/t gold over 1.52 m was reported further down hole (Quinterra Resources Inc., personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Unigold Resources Ltd.

Unigold Resources carried out a 12-hole diamond-drilling program totalling 1112 m on the western portion of the Morin Option property in Muskego, Keith, Reeves and Penhorwood Townships. The drill program was to test geophysical targets outlined during the 1986 exploration program. Two holes drilled near the west-trending, carbonate-sericite alteration zones carried low but anomalous gold values associated with pyrite and arsenopyrite mineralization. The second hole, UM-2, cut a highly altered, mineralized and mylonitized porphyry body over a 27.9 m core length. Unigold reported a 17 m portion of this zone with values of 400 and 500 ppb gold (Durham Geological Services Inc., personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Isaac Burns Properties

Isaac Burns holds two properties in west-central Chester Township. On the west side of Clam Lake, three diamond-drill holes totalling 265 m were completed on a one-claim property. The holes were drilled to test a northwest-trending mineralized zone over a 185 m strike length. Mineralization consisted of minor pyrite and chalcopyrite in wide, multiple zones of mylonitized and locally chloritized granodiorite. Within the mylonite zones, narrow quartz-pyrite veins and thin bands of massive pyrite-chalcopyrite and sphalerite occur over widths up to 5.5 m.

Southeast of Clam Lake, three diamond-drill holes totalling 146 m were completed on a property of three unpatented claims. Several narrow, silicified, quartz-pyrite vein zones were reported (D. Constable Consulting Inc., personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Blanchard Property

E.J. Blanchard holds ten unpatented claims in northwestern Chester Township, southeast of Clam Lake. Early in 1987, a three-hole diamond-drill program totalling 204.5 m was completed to test a gold-bearing mineralized zone at depth. Silicified and sericitized granodiorite, narrow quartz-carbonate and quartz-sulphide vein zones were reported (D. Constable Consulting Inc., personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Grandad Resources Ltd.

Grandad Resources has recently optioned the Burton Property, consisting of six patented and 41 unpatented mining claims, in northeastern Esther Township. A 14-hole surface diamond-drill program totalling 915 m was completed by Grandad Resources in 1987, to verify gold mineralized zones on the property and to test geophysical anomalies.

Previous drilling on the property had indicated a preliminary mineral inventory in the Shaft Zone of 17 460 t grading 10.09 g/t gold to a depth of 41.28 m. A second mineralized zone 450 m east of the Shaft Zone was also drill tested, with the best intersection averaging 9.34 g/t gold over 1.77 m.

Initial results of Grandad Resources' drill program have been encouraging and an additional 3050 m diamond-drill program is planned following detailed geochemical and geophysical surveys over the anomalous zones (The Northern Miner, August 17, 1987; Grandad Resources Ltd., 1987, personal communication, 1987; Assessment Files, Resident Geologist's Office, Timmins).

Odyssey Explorations

Odyssey Explorations holds eleven patented claims straddling Middle Three Duck Lake in central Chester Township. During 1987, detailed ground geophysical surveys, geological mapping, and sampling were carried out. Three previously documented gold occurrences were confirmed and a new occurrence was discovered during the mapping program. A follow up diamond-drill program has been recommended to test the zones at depth. Surface exposures indicate the presence of two distinct vein sets, a northwest-trending set and a northeast-trending set. The gold mineralization shares many similarities with other, better known occurrences in the immediate area (i.e. The Chesbar–Murgold Property and the Young-Shannon Gold Mines–Northquest Ventures Property), which are characteristically narrow and high grade (David R. Bell Geological Services Inc., for Odyssey Exploration, 1987, personal communication, 1987).

Emerald Isle Resources Inc.

Emerald Isle Resources holds nine unpatented claims located between Clam Lake and Three Duck Lake in northwestern Chester Township. Late in 1987, a limited diamond-drill program was in progress on the property to test gold bearing mineralized zones discovered in 1985 (Emerald Isle Resources Inc., personal communication, 1987).

Chesbar Resources Inc.

Chesbar Resources recently acquired an option on five unpatented claims in northeastern Yeo Township, just west of Clam Lake. Initial evaluation of the main showing revealed the presence of high grade gold over narrow widths, in sheared migmatitic trondhjemite mineralized with pyrite, chalcopyrite and sphalerite. During 1987, Chesbar carried out line cutting, ground geophysical surveys and geological mapping over the property. A limited diamond-drill program is scheduled for early 1988 (Chesbar Resources Inc., personal communication, 1987; The Northern Miner, July 6, 1987).

Glen Roy Resources Inc.

Glen Roy Resources controls a block of three patented claims and eight unpatented claims covering the northeastern portion of Clam Lake in northwestern Chester Township. The former Baxter Minerals (Clam Lake Gold Mines Ltd.) gold occurrence, located on patented claim S.8995, is the major showing on the property. The gold bearing structure has been traced intermittently by trenching and diamond drilling from the Main Zone located on the eastern shore of Clam Lake, westward to the West Zone located on the Yeo–Chester Township boundary, a distance of over 800 m. In 1979, a 45.72 m, two-compartment, vertical shaft was put down by Baxter Minerals Limited on the main showing located on patented claim S.8995, but no lateral work or production was reported.

Late in 1987, Glen Roy Resources' diamond drilled four holes totalling 552 m. Two holes were drilled from the northern shore of Clam Lake, to test the westward extension of the Main Zone. Two holes were drilled on the north-south boundary of patented claim S.8995 and unpatented claim P.734210 to test the eastward continuation of the Main Zone. Quartz veining and sulphide mineralization similar to the Main Zone gold occurrence were observed in the drill core, but at year-end, no assay values had been reported (Glen Roy Resources Inc., personal communication; Assessment Files, Resident Geologist's Office, Timmins).

Canadian Gold Resources Incorporated–Monte Carlo Gold Mines Limited–Lyndex Explorations Limited

Canadian Gold Resources and their joint venture partners began a surface bulk sampling program on their Kidd No. 2 deposit located in northeastern Chester Township. The deposit is located at the eastern boundary of a block of eleven leased claims, tied on to the Chesbar Resources–Murgold Resources joint venture property (see Property Evaluation and Development, above). The eastward extension of the Kidd No. 2 zone is known as the "20 Zone" on the Chesbar–Murgold property. A total of 6457.3 t of mineralized rock have been trucked to and stockpiled at the Diepdaume Mines Ltd. milling facilities in Timmins.

On the Kidd No. 1 zone, located on the west half of the property, twelve, surface diamond-drill holes totalling approximately 2400 m were completed in 1987. The zone has been tested over a 490 m strike length to a maximum depth of 180 m. Drilling, to date, indicates the presence of a steeply south-dipping shear zone varying in width from 2.5 to 5.0 m, in hybrid granodiorite to gabbro. Gold mineralization is associated with quartz veins, lenses and stringer zones containing abundant pyrrhotite-chalcopyrite sulphide mineralization. Values in core are described as erratic due to nugget effect.

Canadian Gold Resources diamond drilled a 124 m hole on a two-claim group located approximately 800 m west of the leased claim block and on strike with the No. 1 zone. A 4.8 m section from this hole reportedly averaged 2.6 g/t gold which included 1.22 m grading 8.6 g/t gold (The Northern Miner, December, 1986; Canadian Gold Resources Limited, personal communication, 1987).

OTHER EXPLORATION PROGRAMS

Cane Corporation optioned 36 claims in north-central Mallard Township, from Cominco Limited. A minimum $175 000 expenditure commitment by March 1, 1988, has been made by Cane Corporation who can earn 100 percent interest in the property by spending $750 000 (Cominco has a back in option). Line cutting, ground geophysical surveys, and diamond drilling will be done to test gold occurrences discovered initially by Cominco in 1940 (The Northern Miner, August, 1987; Cominco Limited, personal communication, 1987).

Consolidated Silver Butte Mines Limited carried out stripping and trenching on several of its properties in the southeast Swayze area.

652422 Ontario Incorporated holds 38 claims in Silk Township and 50 claims in Horwood Township surrounding the Orofino Resources, Swayze Mine property. Ground geophysical surveys were carried out over parts of the properties. Additional geophysical surveys and diamond drilling are planned for 1988.

Emerald Isle Resources Incorporated flew an 83 km airborne geophysical survey over two claim groups located in Swayze Township.

Artax Exploration Services carried out ground geophysical surveys on a 26-claim group in central Penhorwood Township. The property was subsequently optioned.

Jarvis Resources Limited flew a 50.5 km airborne geophysical survey on their 25-claim property in northwestern Swayze Township.

Kenty Exploration Limited completed geophysical surveys on the west half of their 44-claim property in southeastern Rollo Township in preparation for a limited diamond-drill program planned for early 1988.

Quinterra Resources Limited and Golden Rim Resources Limited are joint venture partners on the 100-claim Cree Lake Property located in Swayze and Cunningham Townships. Early in 1987, six diamond-drill holes totalling 903 m were completed to test ground geophysical targets.

D. Morin and F. Ross completed prospecting, trenching, stripping, and sampling on their Penhorwood Township property. A gold showing and a zinc showing were discovered in 1987.

A. Maskevich completed line cutting and ground geophysical surveys on the Maskevich Property. in 1987.

Murgold Resources conducted line cutting, ground geophysical surveys, and limited diamond drilling over four separate claim groups located in Chester, Benneweis, and Groves Townships. Work will continue in 1988.

Northern Resources Incorporated holds several hundred claims in Swayze, Dore, Garnet, and Ivanhoe Townships. Some trenching, stripping, and prospecting was carried out in 1987. Anomalous platinum values were reported from altered komatiitic flows mineralized with pyrrhotite and chalcopyrite.

Teck Corporation carried out a preliminary evaluation on their six-claim group covering the Radio Hill Iron Formation in west-central Penhorwood Township.

ABITIBI BELT EXPLORATION ACTIVITY

Falconbridge Limited

Falconbridge Limited was again the most active company exploring in the Timmins area in 1987. Diamond-drill programs were carried out in 13 townships, and reverse circulation drilling in three townships. Base metal exploratory drilling in 1987, amounted to 48 percent of the total drilling compared to 16 percent last year. The other 52 percent of this year's drilling was for gold exploration. Total diamond drilling was 200 holes totalling 66 307 m (a fifty percent increase over last year). In 1987, 110 reverse circulation holes were drilled, all for base metal exploration.

Base metal exploration diamond drilling was carried out in: Clergue Township, 1 hole (530 m); Godfrey Township, 18 holes (8640 m); Jamieson Township, 2 holes (958 m); Kidd Township, 25 holes (12 065 m); Mahaffy Township, 2 holes (949 m); Prosser Township, 11 holes (3607 m); and Reid Township, 3 holes (1008 m).

Exploratory diamond drilling for gold was carried out in Cody Township, 4 holes (1267 m); Hoyle Township, 54 holes (17 154 m); Lucas Township, 8 holes (2927 m); Matheson Township, 41 holes (9696 m); Tisdale Township, 1 hole (260 m); and Whitney Township, 30 holes (7246 m).

Of the 1987 drilling in Hoyle Township, 12 holes (4018 m) were drilled on the 1986 gold discovery of the Syngold Explorations Incorporated–Falconbridge Limited Joint Venture, just south and west of the Owl Creek Gold Mine. It was reported that gold mineralization was intersected in over three quarters of the holes drilled with the best intersections grading 12 g/t over 10 m and 10.3 g/t over 5 m in two of the holes. The gold zone on the property has a minimum strike length of 152.4 m and extends vertically from 152.4 m below surface to at least 518.2 m (Falconbridge Limited, personal communication, 1987; The Northern Miner, November 2, 1987).

Noranda Exploration Company Limited

In 1987, Noranda Exploration Company Limited drilled five holes totalling approximately 1000 m on their claims in Mann and Little Townships. Electromagnetic conductors alongside ultramafic rocks were the targets. Many conductors exist in the area and drilling to test some of them will continue in 1988.

Noranda, in a joint venture with McChip Resources, drilled five holes totalling 1500 m on the optioned property of Pominex Limited (now called Canarchon Holdings Limited) in the northeastern corner of Macklem Township. Five additional holes totalling 1500 m were drilled on Noranda's Property in Stock Township adjacent to the Pominex property. Drilling was still in progress at the end of 1987.

Five holes (1500 m) were drilled in the volcanic horizon in the southeastern part of Mountjoy Township.

Noranda submitted assessment work reports for geophysical surveys completed in the spring of 1986, on their Lower Detour Lake property. Diamond drilling is scheduled to begin on the property this winter, if a drill is available. Noranda continued its search for gold north of Hearst in the summer of 1987. During March 18 to 27, 1984, an aeromagnetic survey was completed for Noranda Exploration in the Fox River area of Northern Ontario. Forty-one claims in eight groups were subsequently staked in July, 1987 (Noranda Exploration Company Limited, personal communication, 1987).

TABLE 10.5 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM	--Airborne electromagnetic survey
Ag	--Silver
AMag	--Airborne magnetic survey
ARes	--Airborne resistivity survey
Au	--Gold
AVLF	--Airborne VLF-EM survey
BM	--Base Metals
BS	--Beneficiation Studies
CS	--Core Samples
Cu	--Copper
DD	--Diamond Drilling (DD-# of holes-total meterage)
Dupl.	--Duplicate
EM	--Electromagnetic survey
Expnd.	--Expenditures
GC	--Geochemical survey
GL	--Geological survey
Grav	--Gravity survey
HLEM	--Horizontal loop electromagnetic survey
IP	--Induced polarization survey
Mag	--Magnetic survey
Man	--Manual labour
Mech	--Mechanical work
Nb	--Niobium
OVD	--Overburden drilling
Pd	--Palladium
Pros	--Prospectus
Pt	--Platinum
Rad	--Radiometric survey
Rtr	--Trenching
SA	--Sampling, Assays
Str	--Stripping
U/G wrk	-Underground work
VLEM	--Vertical loop EM
VLF	--Very low frequency EM survey
Zn	--Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Abbott, Opasatika, Fergus, Legge, Walls, Marjorie, Parnell, Templeton, Minnipuka, Roche, Scholfield, Caithness, Ecclestone, Rykert, Pelletier	42B/13, 42G/2NW,3, 4,5W,6,7SW	Golden Trio Minerals	Au	Assess.	AMag,AVLF	1987	2.10120	T-3127
Adams	42A/6SW	Porcupine Balmoral	Au	Assess.	Mag,VLF	1986	2.9518	T-143
Adams, Eldorado	42A/6S	Noranda Exploration	Au	Assess.	AMag,AVLF	1986	2.9925	T-3137
Avon	42H/13SE	Leo Lefebvre	BM	Assess.	Man	1986		T-2340
Benneweis	41P/12SW	633861 Ontario Inc.	Au,BM	Assess.	AMag,AVLF	1985	2.9434	T-3123
Benton	41O/9NW	Weaco Resources	Au	Assess.	DD-3-461m	1986		T-3054
				Assess.	Assay expnd.	1986	2.9632	T-3054
Benton, Mallard	41O/9NW	Noranda Exploration	Au	Assess.	DD-6-1010.7m	1985		T-2305
Blackstock, Carman, Langmuir, Thomas	42A/7SW	Ventex Energy Ltd.	Au	Assess.	Mag,IP,HLEM	1987	2.10113	T-2939
Blackstock, Langmuir	42A/7SW	Dome Exploration	Au	Assess.	DD-1-327.7m	1986		T-2997
Blackstock, Fasken, Langmuir, Fallon	42A/7SW	Dome Exploration	Au	Assess.	DD-22-5439.4m	1985-86		T-2997
Bond	42A/10SW	Esso Resources Ltd.	Au	Assess.	DD-1-184.7m	1986		T-3095
	42A/10S,7N	Noranda Exploration	Au	Assess.	DD-2-492m	1986		T-2857
	42A/7N,10SE	Westmin Resources	Au	OMEP	Dupl. DD	1984	63.4525 OM83-5C-317	T-2440
Bond, Sheraton	42A/7N	Unigold Resources	Au	Assess.	DD-6-1603m	1987		T-2714
Bristol	42A/5NE,6NW	Cominco Ltd.	Au	Assess.	Mag,VLF	1986	2.9741	T-1948
				Assess.	Str	1986		T-1948
				Assess.	GC,assays	1986	2.10188	T-1948
				Assess.	Mag,VLF	1986	2.10453	T-1948
				Assess.	DD-3-513m	1987		T-1948
	42A/5NE	Chevron Minerals	Au	Assess.	AVLF	1987	2.10506	T-2718
Bristol, Ogden	42A/6NW	Dome Exploration	Au	Assess.	DD-17-3767.4m	1985-86		T-2944
Carman, Langmuir	42A/6SE	Golden Pheasant Res.	Au	Assess.	Mag	1987	2.9980	T-3135
				Assess.	GL	1987	2.10112	T-3135
Caracallen	42A/5NE	Cleyo Resources	Au	OMEP	Mag,VLF,HLEM,GL	1983	63.4340 OM83-5C-75	T-2628
	42A/5NE	Hawk Resources	Au	Assess.	DD-4-259.1m	1986		T-3096
				Assess.	Mag,HLEM,assays, OVD-30-310.9m	1986	2.9532	T-3096
Caracallen, Denton	42A/5SE	P.J. Colbert	Au	Assess.	DD-4-273.4m	1987		T-3000
Chester	41P/12SW	E. Blanchard	Au	Assess.	DD-3-204.5m	1987		T-3028
	41P/12SW	Blue Falcon Mines	Au	Assess.	Str,Man	1987		T-2837
	41P/12SW	Isaac Burns	Au	Assess.	DD-4-411.2m	1987		T-3024
	41P/12SW	Chester Minerals	Au	OMEP	GL,IP,VLF,Str, Rtr	1984	63.4435 OM84-8C-131	T-2023
	41P/12SW	Cons. Silver Butte	Au	Assess.	GL,GC,assays	1986	2.9923	T-3020
	41P/12SW	Emerald Isle Res.	Au	Assess.	DD-3-124.9m	1986		T-2994
	41P/12SW	Murgold Resources	Au	Donated	Prospectus	1987		T-2433

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Chester, Benneweis, St. Louis	41P/12SW	Murgold Resources	Au	OMEP	GL,GC,VLF, DD-24-2300m	1982,83	63.4370 OM83-5C-279	T-2433
				OMEP	GL,AEM,AVLF, AMag,VLF,Mag, DD-16-1153.4m	1984	63.4436 OM84-5C-147	T-2433
				OMEP	DD-11-429.2m, OVD-50-701m, Mag,VLF	1985	63.4592 OM84-5C-390	T-2433
Chester, Yeo	41P/12SW, 41O/9SE	Blue Falcon Ms./ Kidd Resources	Au	Assess.	GL	1987	2.10191	T-3020
Clergue, Little, German, McCart, Mann, Newmarket	42A/10W, 11NE,14SE, 15SW	Angela Developments	Cu,Zn	Assess.	AMag,AVLF	1986	2.9590	T-2744
Clergue	42A/10N	Kidd Creek Mines	BM	Assess.	GL	1986	2.9644	T-2989
	42A/10N	Lac Minerals	Cu,Zn	Assess.	DD-1-191m	1985		T-3003
				Assess.	DD-1-100m	1985	2.9669	T-3003
Clergue, Hoyle	42A/10W, 11SE	A.J. Salo	Au,BM	Assess.	AMag,AVLF	1986	2.9597	T-3063
Cody	42A/11SE	Comstate Resources	Au	Assess.	GL	1987	2.10397	T-2723
	42A/10SW	J.P. Sheridan	Au	Assess.	DD-2-304.2m	1987		T-3010
				Assess.	assays	1987	2.10104	T-3010
Cody, Macklem	42A/7NW, 10SW	Pamour Inc.	Au	Assess.	OVD-13-368.2m	1987	2.10105	T-1573
Deloro	42A/6NW	A. Aube	Au	Assess.	Mag,VLF	1987	2.10366	T-2785
	42A/6NW	Canamax Resources	Au	Assess.	DD-1-240.8m	1986		T-2846
	42A/6NE	Diepdaume Mines	Au	OMEP	Mag,EM,Rad	1984	63.4505 OM83-5C-287	T-2498
	42A/6NW	Findore Minerals	Au	Assess.	Mag,VLF	1987	2.10554	T-2710
	42A/6NW	Fred Harvey	Au	Assess.	Str,Man,Mech	1987		T-1663
				Assess.	assays	1987	2.10485	T-1663
	42A/6N	J.A. Mortson	Au	Assess.	Mag,VLF	1986	2.9511	T-3017
	42A/6	Pamour Inc.	Au	Assess.	Str	1987		T-2544
	42A/6NE	Pamour Inc./ Loki Resources J.V.	Au	Assess.	OVD-94-209.2m	1985	2.9645	T-2915
	42A/6NE	Puissance Corp.	Au	OMEP	DD-11-1396.6m, GL,SA	1984	63.4536 OM84-5C-96	T-2839
	42A/6NE	J.P. Sheridan	Au	Assess.	Man	1987		T-2811
				Assess.	GL,assays	1987	2.10393	T-2811
	15/01	Vatco Exploration	Au	OMEP	GC	1983	OM83-5C-163	T-2733
Deloro, Ogden	42A/6NW	Logan Porcupine Ms./ Kenilworth	Au	OMEP	U/G SA,assays	1984	63.4549 OM84-5C-199	T-140
Denton	42A/5SE	Brown-McDade/Newmont	Au	Assess.	HLEM,GL,GC	1986-87	2.10108	T-1991
	42A/5SE	Golden Range Res.	Au	Assess.	DD-5-610.2m	1986		T-2897
				OMEP	GL,HLEM,assays	1984	OM84-5C-177	T-2897
	42A/5SE	Gowest Amalgamated	Au	OMEP	Mag,EM	1984	OM84-5C-109	T-2738
				Assess.	DD-5-906.2m	1987		T-2738
Denyes	41O/15S	E.J. Blanchard	Au	Assess.	AMag,AVLF	1987	2.10361	T-2792
	41O/15S	Glen Auden Resources	Au	Assess.	GL,Rtr	1986	2.9967	T-3036
				Assess.	Mag	1987	2.10273	T-3036
Denyes, Swayze	42O/15SE	Norminex Ltd.	Au	OMEP	Mag,GL,GC,assays	1983	OM83-5C-219	T-2796
Denyes, Halcrow, Tooms, Greenlaw	41O/15SW	Collingwood Energy	Au	OMEP	Dupl. data	1984	63.4456 OM84-5C-14	T-2607
Doherty	42G/3NW	Golden Trio Minerals	Au	Assess.	AMag,AVLF	1987	2.10354	T-2797
Doherty, Pelletier, Caithness	42G/N	Homestake Consultants	Au	Assess.	AMag,AVLF	1986	2.9705	T-3133
Dore	41O/15SE	Swayze Resources	Au	OMEP	GC,assays	1983-84	OM84-5I-46	T-2784
Douglas	42A/3NE	Roman Gadzala	Au	Assess.	VLF,Mag	1986	2.9508	T-3092
				Assess.	GL	1987	2.10313	T-3092
Duff, Mann	42A/14SE	L.E. Hill	Au	Assess.	DD-2-76.5m	1987		T-3015

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Dundonald, Evelyn, German	42A/10W	Kangeld Resources	Au	Assess.	DD-6-1274.4m,CS	1987		T-2999
Ecclestone, Fergus, Opasatika	42G/2NW, 3NE	Golden Trio Minerals	Au	Assess.	AMag,AVLF	1986	2.9694	T-3127
Eldorado, Langmuir	42A/6SE	Canico	Au,BM	Assess.	AEM	1985	2.9797	T-3124
English, Semple	42A/3SE	Dome Exploration	Au	Assess.	Mag,HLEM	1987	2.10409	T-2720
Esther	41O/9NW	M. Burton	Au,Ag	Assess.	DD-4-526.1m	1987		T-1920
Esther, Benton	41O/9NW	Canico	Au	OMEP	Mag,GC,Str,Rtr, DD-17-468.2m	1984	63.4493 OM85-20	T-2595
Evelyn	42A/11NE, 10NW	Cominco Ltd.	Au	Assess.	DD-1-201m	1987		T-2885
Fallon	42A/2NW	Asarco Exploration	Au	Assess.	OVD-1-20.7m	1987	2.9968, 2.10265	T-3060
				Assess.	DD-1-150m	1987		T-3060
	42A/3NE, 2NW	D. Meunier	Au	Assess.	DD-3-617.5m	1986		T-2596
				Assess.	assays	1986-87	2.10244	T-2596
Fallon, Fasken	42A/7SW	Agassiz Resources	Au	Assess.	Mag,VLF	1986	2.9855	T-3131
Fallon, Langmuir	42A/6SE, 7SW	D. Meunier	Au	Assess.	DD-4-760.4m	1986		T-2951
				Assess.	GL	1985	2.10365	T-2951
Fergus	42G/3NE	Astralla Resources	Au	Assess.	GL,Mag,VLF,GC	1986	2.9959	T-3122
Fergus, Rykert, Caithness	42G/3N	Astralla Resources	Au	Assess.	AEM,AMag	1986	2.9670	T-3122
Garnet	41O/10NE, 9NW	Western Pacific Energy	Au	Assess.	GL	1986	2.9422	T-2969
				Assess.	assays	1986	2.9422	T-2969
				OMEP	GL,Property Rept.	1984	63.4494 OM84-5P-253	T-2969
Geary	42A/13SE	D. Meunier	Au	Assess.	GL	1986	2.9749	T-3129
German	42A/10SW	Canamax/Bruneau J.V.	Au	Donated	DD-5-747m	1986		T-2696
	42A/10SW	Chevron Minerals	Au	Assess.	AMag,AVLF	1987	2.10505	T-2715
	42A/10SW	Cominco Ltd.	Au	Assess.	DD-2-343m	1986		T-2742
	42A/10SW	Cominco Ltd.	Au	Assess.	DD-1-100m	1987		T-2757
	42A/10SW	D. McKinnon	Au	Assess.	GL	1986	2.9573	T-2606
	42A/10SW	A.J. Salo	Au	Donated	Mag,EM	1986		T-3074
	42A/10SW	R.G. Smith	Au	Assess.	OVD-14-219.2m,SA	1986	2.9416	T-2643
Godfrey	42A/5NE	Esso Resources	Au,Cu	Assess.	DD-1-311m	1985		T-3004
	42A/5NE	Kidd Creek/Esso J.V.	Cu,Zn	Assess.	DD-2-943.6m	1986		T-3085
Godfrey, Jamieson	42A/5NE, 12SE	Kidd Creek Mines	Cu,Zn	Assess.	DD-1-458m	1987		T-2613
Groves, St. Louis	41P/12SE	Thor Resources	Au	OMEP	Dupl. Data	1983	OM83-5C-148	T-2572
Halcrow	41O/15SW	Regal Petroleum	Au	Assess.	Mech,SA, Petrographic Study	1986-87		T-2878
	41O/15SW	Topaz Explorations	Au	OMEP	GC	1984	OM84-5C-226	T-2879
Halcrow, Tooms	41O/15SW	Regal Petroleum	Au	Assess.	GL,GC,IP,Rtr, assays	1986-87	2.9860	T-2878
Halcrow, Tooms, Greenlaw	41O/10NW, 15SW	Regal Petroleum	Au	OMEP	GL	1984	63.4386 OM84-5C-3	T-2878
				Assess.	DD-10-2128.9m, SA,Str	1986		T-2878
Heenan, Marion	41O/16SW	Esso Resources	Au	Assess.	GL	1986-87	2.10367	T-2719
Hillary	42A/5SW	E. Gauthier	Au	Nonasses.	assays	1986	2.9392	T-3001
				Assess.	Str,Man	1987		T-3001
Horwood	42B/1SW	Ingamar Expln.	Au	Assess.	VLF	1986	2.9685	T-1976
	41O/16NW	J.A. Landers	Au	Assess.	DD-1-18.3m	1985		T-2424
				Assess.	Rtr,Man	1986-87		T-2424
				Assess.	Mech(Rtr)	1987		T-2424
	41O/16NW	Orofino Resources	Au	Assess.	Mech(Rtr)	1987		T-2126
	42B/1SW	Irene Owen	Au	Assess.	Rtr	1986		T-1976
	42B/1SW	Pelangio-Larder Mines	Au	Assess.	GL,Mag,VLF	1987	2.10441	T-2712

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hoyle	42A/11SE	A.J. Salo	Au	Donated	Mag	1986		T-3063
	42A/11SE	Moneta Porcupine	Au	Assess.	Mag,VLF	1987	2.10464	T-2721
Huffman	41O/9SE	Kidd Resources	Au	Assess.	Str	1986		T-3094
	41O/9SE	Tonopah Resources	Au	Assess.	GC	1986	2.9523	T-2838
Jamieson	42A/12SE	Kidd Creek Mines	Cu,Zn	Assess.	VLF,HLEM	1987	2.10456	T-2660
Jessop	42A/11SW	D. Meunier	Cu,Zn	Assess.	GL	1986	2.9928	T-3136
Keefer	42A/5S	Galata & Zoebelein	Au	Assess.	Mag,VLF	1987	2.9953	T-1556
	42A/5SW	Noranda Exploration	Au	Assess.	GL	1986	2.9771	T-2924
Keith	42B/1NW	Gail Resources	Au	Assess.	Rtr	1986		T-2776
				Assess.	AMag,AEM,AVLF	1987	2.10370	T-2776
	42B/1NW	Sanford Property	Au	OMEP	Rtr,Str	1983	63.4311 OM83-5I-95	T-2822
Keith, Muskego	42B/1NW	BP Resources/ Selco Division	Au	Assess.	AMag,AVLF	1987	2.10285	T-2717
Kenogaming	42A/4NW	Golden Range Res.	Au	OMEP	GL,Str,SA,IP	1984-85	OM84-5C-177	T-2751
	42B/1NE	D. Morin	Au	Assess.	Man,Str	1987		T-2726
				Assess.	Mech	1987		T-2726
	42A/4NW	Reba Resources	Au	OMEP	VLF,IP	1984	OM84-5C-84	T-2830
Kenogaming, Penhorwood	42B/1NE	D. Morin	Au	Assess.	Str	1986		T-2726
Langmuir	42A/7SW	Dome Exploration	Au	Assess.	Mag,HLEM	1987	2.10169	T-2997
	42A/6SE, 7SW	D. Meunier	Au	Assess.	GL	1985	2.10364	T-2951
Lower Detour Lake	32E/13NE	Duration Mines	Au	OMEP	Mag,HLEM,GL	1984	OM83-5C-316	T-2893 T-2331
	32E/13NE	Noranda Exploration	Au	Assess.	Mag,HLEM	1986	2.9926	T-1735
	32E/13NE	Placer Development	Au	Assess.	Mag,VLF,HLEM,GL	1986	2.9502	T-3091
				Assess.	DD-1-300m	1986		T-3091
				Assess.	GL	1986	2.9807	T-3091
	32E/13NE	Westmin Resources	Au	OMEP	HLEM,IP	1984	63.4630 OM83-5C-315	T-2331
Lower Detour Lake, Atkinson Lake	32E/13E	Getty Resources	Au,Ag,Cu, Zn	Donated	DD-5-839.4m,HLEM	1986		T-2443
	32E/13E	Petromet	Au	OMEP	Dupl. DD	1984	OM83-5C-301	T-2772
Lower Detour Lake, Sunday Lake	32E/13NE, 32L/4SE	Westmin Resources	Au	Assess.	DD-3-654m	1987		T-2331
				Assess.	Mag,VLF,HLEM	1987	2.10037	T-2331
				OMEP	GL,GC,assays	1984-85	63.4622 OM84-5C-348	T-2331
Lucas	42A/14W	Falconbridge Ltd.	Au	Assess.	Mag,VLF	1987	2.10173	T-2949
	42A/14W	Kidd Creek Mines	Au	Assess.	OVD-10-300.6m	1986	2.9579	T-2949
				Assess.	OVD-4-75.6m	1986	2.10022	T-2949
				Assess.	OVD-4-81.4m	1986	2.10045	T-2949
				Assess.	Mag,HLEM	1986	2.9689	T-2949
				Assess.	DD-1-468.5m	1987		T-2949
Macdiarmid	42A/11NW	Kidd Creek Mines	Cu,Zn	Assess.	DD-1-280m	1986		T-2899
	42A/11NW, 12NE	566307 Ontario Ltd.	Au	OMEP	GC,Grav,DEEPEM	1985	63.4640	T-2905
Macklem	42A/7NW, 10SW	Agassiz Resources	Au	Assess.	Mag,VLF	1986	2.10077	T-3053
	42A/7NW	Kidd Creek Mines	Au	Assess.	Mag,HLEM	1986	2.9563	T-3099
				Assess.	OVD-16-733.7m	1986	2.10023	T-3099
				Assess.	DD-3-935m	1986		T-3099
	42A/10SW	Pamour Inc.	Au	Assess.	DD-7-1115.9m	1986-87		T-2313
	42A/10SW	Pominex	Au	OMEP	GL,assays, DD-14-3346.7m	1983-84	63.4363 OM83-5C-246	T-3081
Mahaffy, Reid	42A/13SE	Kidd Creek Mines	Cu,Zn	Assess.	DD-1-494m	1987		T-2844
Mann, Little	42A/14SE, 15SW	Noranda Exploration		Assess.	AEM	1985	2.10052	T-3044
				Assess.	DD-5-976.7m	1987		T-3044
Marion	41O/16S	Monte Carlo G.M.L.	Au	Assess.	GL	1987	2.10318	T-2728

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Massey, Whitesides	42A/5N	R.R. Burt	Au,Pt,Pd	OMEP	assays	1984	OM84-5P-239	T-2901
Matheson	42A/10SW	Cominco Ltd.	Au	Assess.	DD-2-294m	1986		T-2403
	42A/11SE	E. Mord	Au	Assess.	VLF	1987	2.10042	T-3138
	42A/10SW	Noranda Exploration	Au	Assess.	GL	1987	2.10132	T-2697
				Assess.	Mag,VLF	1987	2.10198	T-2697
	42A/10SW	Pamour Inc.	Au	Assess.	DD-9-1416.4m	1986		T-2984
	42A/11SE	A.J. Salo	Au	Donated	Mag	1986		T-3108
McArthur	42A/3NW	United Kingdom Energy	Au	Assess.	Mag,VLF,GL	1986	2.9555	T-3098
				Assess.	OVD-21-510.2m	1986	2.10492	T-3098
Mountjoy	42A/11SW	Comstate Resources	Au	Assess.	assays	1986	2.9630	T-2526
	42A/11SW, 6NW	Grand Saguenay Mines & Minerals	Au	OMEP	Property Rept.,	1983	63.4553	T-2882
					Dupl. Data	1984	OM83-5C-309	
	42A/6NW	Noranda Exploration	Au	Assess.	GL	1986	2.9682	T-3093
				Assess.	DD-2-655.3m	1986		T-3093
				Assess.	OVD-15-624.2m	1986	2.9491	T-3093
Mountjoy, Jessop, Murphy	42A/11SW	Pamour Inc.	Au	Assess.	OVD-70-2284.1m	1986	2.10110	T-3029
Murphy	42A/11SE	Comstate Resources	Au	Assess.	VLF	1987	2.10307	T-2482
	42A/11SE	Moneta Porcupine Ms.	Au	Assess.	Mag,VLF	1987	2.9995	T-3132
				Assess.	Mag,VLF	1987	2.10357	T-3132
				Assess.	Mag,VLF	1987	2.10438	T-3132
				Assess.	Mag,VLF	1987	2.10432	T-3132
				Assess.	Mag,VLF	1987	2.10468	T-3132
Murphy, Hoyle	42A/11SE	Canamax/Bell Creek	Au	OMEP	Str,Rtr,U/G wrk., Property Repts., DD-13-2451m	1984	63.4458 OM83-5JV-334	T-2787
Murphy, Wark	42A/11SW	Comstate Resources	Au	Assess.	GL	1987	2.10337	T-2482
Muskego, Keith	42B/1NW	Utah Mines	Au	Assess.	DD-5-707.2m	1986		T-2991
Nursey, Sothman	41P/14NW	Dome Exploration	Au	Assess.	Mag	1987	2.10170	T-2919
Ogden	42A/6NW	Noranda Exploration	Au	Assess.	OVD-10-303.9m	1986	2.9747	T-2801
				Assess.	Mag	1986	2.9806	T-2801
	42A/6NW	Noranda Exploration	Au	Assess.	VLF	1987	2.10326	T-3025
				Assess.	Gl	1987	2.10319	T-3025
Osway	41O/9NW	Cons. Silver Butte	Au	Assess.	Str	1986		T-3020
Osway, Huffman	41O/9SE	Kidd Resources	Au	Assess.	Str	1986		T-3094
	41O/9E	Muscocho Explns.	Au	OMEP	Mag,VLF, DD-24-3392.7m	1984	63.4524 OM84-5P-329	T-2694
Panet	41O/14SW	D.M. Rogers	Au	Assess.	Rtr,Man	1987		T-2847
Penhorwood	42B/1NE	Artax Exploration	Au	Assess.	Mag,EM	1986	2.9723	T-3125
	42B/1NE	Utah Mines	Au	Assess.	DD-4-655.3m	1987		T-3076
Pivabiska River	42J/4SE	Noranda Exploration	Au	Assess.	DD-1-215.2m	1985		T-2916
Pivabiska River, Fox R., Renesig Cr., W. of Burstall Twp.	42J/4S,3W	Noranda Exploration	Au	Assess.	AMag	1987	2.10413	T-2916
Price, Thorneloe	42A/6SW	Chevron Minerals	Au	Assess.	AMag,AVLF	1987	2.10493	T-2713
Prosser	42A/14S	Kidd Creek Mines	Au,BM	Assess.	AMag,AEM,AVLF	1987	2.9899	T-3121
			Au,BM,Pt,Pd	Assess.	OVD-3-112.8m, assays	1986	2.9770	T-3121
Raney	41O/15SW	Goldrock Resources	Au	Assess.	Mag	1987	2.10026	T-3068
				Assess.	HLEM,Mag	1987	2.10249	T-3068
				Assess.	HLEM	1987	2.10250	T-3068
	41O/15SW	J-Dex Mining (Glen Auden/Goldrock)	Au	Assess.	Mag,VLF,IP	1986	2.9495	T-2180
Reaume, Mann, Hanna, Duff	42A/14NE	Imperial Platinum Corp.		Assess.	Mag,VLF	1987	2.10144	T-2955
Reeves, Penhorwood, Sewell, Kenogaming	42B/1NE	Goldrock Resources/ Glen Auden Res. J.V.		Assess.	GC,assays	1987	2.10291	T-2722
Reeves, Penhorwood, Keith, Muskego	42B/1NE	Unigold Resources	Au	Assess.	GL,Mag,IP,HLEM	1986	2.9744	T-3126
				Assess.	Str	1986		T-3126
				Assess.	DD-12-1112m	1987		T-3126

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Reid	42A/12NE, 13SE	Kidd Creek Mines	Cu,Zn	Assess.	Mag,VLF,EM,HLEM	1986-87	2.9769	T-3043
				Assess.	DD-3-1008m	1987		T-3043
Ridge Lake Area, South of	42J/6SW	Camchib Mines	Phosphate, Nb	OMEP	SA,BS,assays, Property Repts., OVD-38-2886.6m	1983,84	63.4400 OM83-5C-160	T-2935
Robb	42A/12SE	Jonpol Exploration	Au	OMEP	GL,VLF,assays	1984	63.4518 OM84-5C-216	T-2948
	42A/12SE	Legion Resources	Au	Assess.	DD-5-622.4m	1987		T-2982
Robb, Cote	42A/12SE	Asarco Exploration	Au	Assess.	DD-2-520m	1986		T-2958
Robb, Jamieson	42A/12SE	Aslan Expln./Dev.	Au,BM	Assess.	GL	1986	2.9691	T-3130
Rollo	41O/15NE	Carlson Mines	Au	OMEP	Property Rept., assays,Rtr	1983	63.4364 OM83-5C-247	T-1987
	41O/15E	Hansen Lake Resources	Au	OMEP	GC	1983-84	OM84-5I-406	T-2963
	41O/15SE	Kenty Resources	Au	OMEP	assays	1983	OM83-5C-177	T-2731
Rykert	42G/3NE	Eldor Resources	Au	Assess.	AMag,AVLF	1987	2.10239	T-2872
Semple	41P/14NE	Mary Storey	Au	Assess.	Man,Mech	1986		T-3033
				Assess.	Man	1987		T-3033
Semple, Hutt	42A/3SE, 14NE	Pamorex Minerals	Au	Assess.	Str	1987		T-2884
Sewell, Reeves	42B/1NE	Goldrock Resources	Au	Assess.	Mag,VLF	1986	2.9684	T-3119
				Assess.	GL	1986	2.9737	T-3119
Shaw	42A/6NE	Brown-McDade Expln.	Au	Assess.	Str	1987		T-2988
				Assess.	GL,IP	1987	2.10331	T-2988
	42A/6NE	Chevron Minerals	Au	Assess.	Str	1986		T-3069
	42A/6NE	Cominco Ltd.	talc	Assess.	DD-1-176m	1987		T-3031
	42A/6NE	Findore Minerals	Au	Assess.	Mag,VLF	1987	2.10460	T-2711
Shaw, Whitney	42A/6NE	Chevron Minerals	Au	Assess.	OVD-GC	1986	2.10165	T-3069
				Assess.	Rtr,SA	1986-87	2.10164	T-3069
				Assess.	Str	1986		T-3069
Sheraton	42A/7N	Lac Minerals	Au	Assess.	DD-2-422m	1985		T-3002
				Assess.	DD-2-455m	1986		T-3002
				Assess.	DD-1-300.8m	1985-86		T-3002
Sheraton, Thomas	42A/7N	Ventex Energy	Au	Assess.	Mag,IP,HLEM	1987	2.10205	T-2806
Silk	41O/16NW	652422 Ontario Ltd.	Au	Assess.	Mag,VLF,VLEM	1986	2.9813	T-3056
Silk, Horwood	41O/16NW	Orofino Resources	Au	OMEP	GL,DD-46-7164.3m	1983	63.4296 OM83-5C-23	T-2126
				OMEP	GL,SA,BS,Rtr, DD-10-1110.2m	1984	63.4539 OM83-5C-223	T-2126
Slack	42G/1SW	J. Arsenault	Au,BM	Assess.	Man	1986		T-2363
				Assess.	Man,Mech	1987		T-2363
Stock	42A/10SW	R. Allerston	Au	Assess.	Mag,HLEM	1986	2.9633	T-3105
	42A/10S	Camden Resources	Au	Assess.	Mag	1987	2.10118	T-3030
	42A/10S	Cominco Ltd.	Au	Assess.	DD-2-350m	1986		T-2742
	42A/10S	Noranda Exploration	Au	Assess.	GC	1987	2.10160	T-3035
	42A/10S	St. Andrew Goldfields	Au	OMEP	U/G DD-2-240m Property Rept.	1983-84	63.4295 OM83-5C-29	T-3088
				OMEP	DD-24-4628.2m, U/G DD-346-16,523.6m	1984	63.4489 OM83-5C-282	T-3088
	42A/10SE	Stockgold Resources	Au	Assess.	Mag	1987	2.9902	T-3134
Stock, German	42A/10SW	Noranda Exploration	Au	Assess.	DD-2-639.8m	1987		T-3035
				Assess.	Mag	1987	2.10012	T-3035
Sunday Lake Area	32L/4SE	Canfic Resources/ Lancaster Resources	Au	OMEP	HLEM	1984	OM84-5JV-123	T-2775
Swayze	41O/15SE	Emerald Isle Res.	Au	Assess.	Str	1986		T-3117
				Assess.	AMag,AVLF	1987	2.10363	T-3117
	41O/15SE	Glen Auden Resources	Au	Assess.	Mag,HLEM	1987	2.10271	T-3036
	41O/15SE	Raretech Min. Inc.	Au	Assess.	AMag,AVLF	1987	2.10360	T-2761
	41O/15SE	Jarvis Resources	Au	Assess.	AMag,AVLF	1987	2.10362	T-2724
Swayze, Cunningham	41O/15SE	Quinterra/ Highland Crow	Au	Assess.	DD-6-902.8m	1987		T-2649

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Swayze, Denyes	41O/15SE	Glen Auden Resources	Au	Assess.	GL	1986	2.9965	T-3036
				Assess.	Mag	1987	2.10272	T-3036
				Assess.	GC	1987	2.10509	T-3036
Swayze, Denyes, Dore	41O/15S	Canico	Au	OMEP	Mag,IP,GL	1984	63.4493 OM85-20	T-2446
Swayze, Tooms, Cunningham,Halcrow, Greenlaw	41O/15S, 10NW	Quinterra Resources	Au	OMEP	AMag,AVLF,Mag, VLF,IP,GL,assays, DD-4-559.3m	1984-85	63.4501 OM84-5C-49	T-2493 T-2649
Talbott, Caithness, Ebbs, Scholfield, Franz, Roche	42G/4N,5, 6SW, 41F/1NE	Kaphearst Resources	Au	Assess.	AMag,AEM	1986	2.9642	T-3128
				Assess.	GL	1986	2.9876	T-3128
Thomas	42A/7NW	B.A. Resources	Au	Assess.	GL	1986	2.9738	T-3083
				Assess.	resubmission		2.9483	T-3083
	42A/7NW	Dome Exploration	Au	Assess.	Mag,HLEM	1987	2.10504	T-2709
Thorneloe	42A/5SE, 6SW	Comstate/Falconbridge	Au	Assess.	assays	1986	2.10229	T-3051
	42A/5SE	J. Croxall	Au	Assess.	Str	1986		T-2913
Thorneloe, Bristol	42A/5SE, 6SW	Esso Resources	Au	Assess.	DD-3-898m	1986		T-2890
Tisdale	42A/11SE	Davidson Tisdale	Au	OMEP	DD-3-679.1m,Pros	1983-84	63.4375 OM83-5C-341	T-3014
				OMEP	Property Rept., DD-11-2083m	1983-84	63.4376 OM83-5C-342	T-3014
				OMEP	Summ.Rept., DD-84-17,134.2m	1984	63.4454 OM83-5C-376	T-3014
	42A/11S	Kidd Creek Mine	Au	Assess.	DD-1-260m	1987		T-3008
	42A/11SE	Milner Cons. Silver	Au	OMEP	Mag,HLEM, DD-3-452.9m, OVD-8-64.3m	1985	63.4628 OM84-5C-328	T-2695
	42A/11S	Moneta Porcupine Ms.	Au	Assess.	DD-3-614.7m	1987		T-2727
	42A/11SW	J.E. Mountjoy	Au	Assess.	GL,DD-1-198.7m	1986	2.9905	T-3120
	42A/11SW	Pamour Inc.	Au	Assess.	DD-1-152.7m	1987		T-2439
				Assess.	OVD-10-153.9m	1986	2.9664	T-2439
	42A/6NW	508825 Ontario Ltd.	Au	Assess.	DD-3-111.9m	1987		T-2556
Tisdale, Whitney	42A/6NE	Augdome Corporation	Au	OMEP	U/G DD-6-1077.5m	1983	63.4356 OM83-5P-192	T-2633
Tooms, Greenlaw, Halcrow	41O/10NW	Quinterra Resources	Au	Assess.	Man,Mech	1984		T-2493
				Assess.	DD-11-1640.1m	1987		T-2493
				OMEP	GL,Mag,Rtr,SA	1983	63.4305 OM83-5C-62	T-2493
Turnbull	42A/5NE	546577 Ontario Inc.	Au	Assess.	DD-1-147m	1986		T-3116
				Assess.	Mag,HLEM,IP	1986-87	2.9750	T-3116
	42A/5NE, 12SE	655 Group Holdings	Au,BM	Assess.	Str	1987		T-2612
	42A/5NE	Delbridge Mines	Au	Assess.	DD-7-380.3m	1987		T-2725
	42A/5NE	Galore Gold Resources	Au	OMEP	assays	1984	63.4537 OM84-5C-26	T-2874
	42A/5NE	Golden Trio Minerals	Au	Donated	DD-2-368.2m	1986		T-3116
	42A/12SE	Goldhurst Resources		Assess.	DD-6-971.1m	1987		T-3061
				Assess.	GL	1987	2.10203	T-3061
	42A/5NE, 12SE	Loki Resources	Au	OMEP	Mag	1984	OM84-5C-144	T-2648
Walls	42B/13NW	M. Tremblay	Au	Assess.	VLF	1987	2.10232	T-2807
Wark	42A/11NE	A.J. Salo	Cu,Zn	Assess.	AMag,AVLF	1986	2.9678	T-3063
Whitesides	42A/5NE	Ivan J. Dea	Au	Assess.	Man	1986		T-3072
Whitney	42A/11SE	Kidd Creek Mines	Au	Assess.	DD-1-95m	1987		T-2960
	42A/6NE	Lithium Corp. of Can.	Au	Assess.	Mag,VLF	1987	2.10309	T-2729
				Assess.	GL	1987	2.10501	T-2729
	42A/11NE	Mill City Gold Corp./ Ken Guy	Au	Assess.	Mag,VLF	1987	2.10181	T-2848

TABLE 10.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Whitney	42A/6NE	M. Puddester	Au	Assess.	EM	1986	2.9385	T-3097
				Assess.	Mag	1987	2.10450	T-3097
	42A/11SE	Priority Metals & Minerals	Au	Assess.	DD-1-64.3m	1986		T-3118
	42A/6NE	Wabigoon Resources	Au	OMEP	Photos,SA, assays,Pros, Annual Rept.	1983	63.4374 OM83-5C-332	T-2664
Whitney, Cody	42A/11SE	Falconbridge Ltd.	Au	OMEP	Mag,IP,GL,GC,Str, DD-15-2599m	1984	63.4484 OM84-5P-184	T-2665
Whitney, Deloro	42A/6NE	J.P. Sheridan	Au	Assess.	Mag	1987	2.10082	T-2662
Whitney, German	42A/6NE, 10SW	J.P. Sheridan	Au	Assess.	Mag,VLF	1987	2.10011	T-2662
Yeo	41O/9SE	B & B Mining	Au	Assess.	GL	1986	2.9602	T-3046
	41O/9SE, 41P/12SW	Cons. Silver Butte	Au	Assess.	Str	1986		T-3020

Cominco Limited

In 1987, Cominco drilled six reverse circulation holes and eight diamond-drill holes (947 m) in Lots 9, 10, and 11, Concessions II and III, German Township. This was on a Comstate Resources option in a joint venture with Ark La Tex Industries Limited. Some of the drilling was done to explore around a gold intersection of 12.3 g/t over 1.5 m obtained in 1986, within sediments in the southern half of Lot 11, Concession III. No intersections of economic significance were obtained; however, carbonate alteration within the adjacent volcanic rocks was noted.

In Evelyn Township, Cominco Limited drilled two holes totalling 392 m in search of the source of gold values obtained in till from a previous reverse circulation drill program.

Drilling in six holes, totalling 904 m, was done in early 1987, on claims in Bristol Township optioned from R. Allerston. Four holes (700 m total) were drilled in late 1987. More drilling is planned in 1988.

Cominco evaluated a talc-magnesite deposit in Whitney Township optioned from R. Allerston in 1987. Stripping and trenching were done and a 3.6 t bulk sample was taken. One hole (176 m) was diamond drilled in a talc deposit in the east-central part of Shaw Township (Cominco Limited, personal communication, 1987).

Placer Dome Incorporated

Placer Dome Incorporated carried out two, large diamond-drill programs (one in early 1987, the other in late 1987) on their property in the southeastern corner of Bristol Township. A total of 7453 m were drilled for the year. Drilling will continue in 1988.

The company drilled 22 sonic overburden holes in Langmuir and Blackstock Townships on the Melrose Resources Limited optioned claims.

On Placer Dome's claims in English and Sothman Townships, geophysical and geological surveys were completed.

In Thomas Township, prospecting, trenching, geophysical surveys, and geological mapping were done. Line cutting and a geophysical survey were done on the company's property in the southeastern corner of Sheraton Township (Placer Dome Incorporated, personal communication, 1987).

Placer Development drilled one 300 m hole in the Detour Lake area in November, 1986. The hole, drilled on ground optioned from Mineta Resources, was to test a coincident IP, VLF, and magnetic anomaly. The anomaly was explained by units of pyrrhotite-bearing graphitic argillite (Assessment Files, Resident Geologist's Office, Timmins).

Asarco Exploration Company of Canada Limited

Five exploratory diamond-drill holes were drilled in Maclem Township by Asarco Exploration Company of Canada Limited in 1987. Four of the holes were drilled into an albitite zone. A gold intersection was noted in a hole drilled previously in this zone as follow-up to a 1982 reverse circulation program. A 60 m strike length was established for the albitite. Gold intersections in two holes were 6.3 g/t gold over 4.57 m and 4.15 g/t gold over 13.6 m. The other two holes intersected the zone but obtained lower gold values. This albitite zone is located just north of the Aquarius Deposit and 1.3 km southwest of Asarco's Aquarius Mine shaft. Another hole was drilled to test a magnetic low for carbonate alteration. It was found that the low was due to deep overburden; however, a narrow, low grade gold intersection was obtained in talc-chlorite schist.

In other exploration programs, Asarco drilled seven reverse circulation holes on their claims in Matheson Township and eight reverse circulation holes in Fallon Township (Asarco Exploration Company of Canada Limited, personal communication, 1987).

Esso Minerals Canada

Diamond drilling, in 1987, totalled 13 263 feet in Bristol and Thorneloe Townships on Esso Minerals' Robele Project. The work on the property is in a joint venture with Torogold Resources Limited who earned a 50 percent interest by spending $300 000 on the program. The property is along the trend of the Destor-Porcupine Fault. The area had received little exploration attention in the past due to overburden cover and varying interpretations on the position of the Destor-Porcupine Fault.

Esso discovered, through diamond drilling, a wide alteration zone with anomalous gold in 1984. Subsequent drill programs located a hematitic alteration zone in carbonatized and silicified sedimentary rocks. The areas with better gold values are intensely silicified, brecciated, pyritic, and cut by minor quartz-carbonate veinlets. Drill intersections up to 0.33 ounce gold per ton over 8.5 feet have been obtained. Drilling will resume in January, 1988.

Esso Minerals completed six diamond-drill holes totalling 2486 feet in the west-central part of Tully Township on claims purchased from Labrador Mining Corporation (previously called Hollinger Mines Limited).

One hole, drilled by Hollinger in 1973, returned an assay of 0.40 ounce gold per ton over 3 feet. The six holes were drilled on a 300-foot strike length portion of a shear zone in basalt which has been altered to a silica-carbonate-pyrite assemblage with gold values. A broken and deformed quartz vein up to 5 m thick was intersected in three holes. Core recovery was poor; the quartz vein contained gold values up to 5.1 ounce gold per ton over one foot. The zone of quartz vein and vein stockwork is open and is considered by Esso to merit further exploration. Exploration on the property is funded by Mt. Calvery Resources.

Esso Minerals began geological mapping and soil sampling on their claims in the southeastern corner of Zavitz Township in 1987 (Esso Minerals Canada, personal communication, 1987).

Chevron Canada Resources Limited

Chevron Canada Resources Limited made an agreement with Holmer Gold Mines Limited for the latter company's gold property in Bristol Township. Chevron can earn a 50 percent interest by a work commitment on the property and a cash payment. Mineral inventory on the property consists of 750 000 tons grading 0.11 ounce gold per ton. Diamond drilling began in late 1987 and will continue until the spring of 1988.

In Price Township, Chevron carried out geological mapping and sampling on their property in the eastern part of the township. The company had an airborne survey flown over their properties in the Timmins area (Chevron Canada Resource Limited, personal communication, 1987).

Newmont Exploration of Canada Limited

Four diamond-drill holes totalling 753 m were drilled on the property optioned from Brown McDade Mines Limited in Denton Township. Scattered gold values over narrow widths were intersected. More drilling is planned for 1988 (Newmont Exploration of Canada Limited, personal communication, 1987).

Pamorex Minerals Incorporated

Pamorex Minerals Incorporated drilled 125 reverse circulation holes and completed 7600 feet of surface diamond drilling on their properties in Cody and Macklem Townships in 1987.

In Matheson Township, geophysical surveys were completed, 25 reverse circulation holes were drilled, and a total of 4500 feet of diamond drilling completed.

A large stripping program was done by Pamorex on a property in the northeastern corner of Semple Township. Gold values occur within narrow quartz veins in tholeiitic basalts, some of which are spherulitic. Within the stripped area, a breccia zone of mafic volcanic fragments within a calcite matrix occurs. The matrix has a swirled or flow structure. Geophysical surveys were also completed on the property. In late 1987, diamond drilling began with a total of 2500 feet completed for the year. Drilling will continue in 1988.

An 8000-foot diamond-drilling program was done in Tisdale Township. In one area, northeast and along strike of the Hollinger, McIntyre, and Coniaurum gold system, an area of carbonate alteration is located. No near-surface gold mineralization has been encountered; however, it is thought that this alteration may be the result of an intrusive porphyry at depth. Since gold mineralization in the previously mentioned three mines is spacially associated with porphyries, a deep drill project has been started to test this hypothesis (Pamorex Minerals Incorporated, personal communication, 1987).

Bruneau Mining Corporation, Montclerg Resources

In 1987, Bruneau Mining Corporation entered into an agreement with Montclerg Resources. Bruneau Mining Corporation can earn an interest in the latter company's gold deposit in Clergue and Walker Townships with cash payments and a work commitment.

The property hosts a small, low grade gold deposit with inferred reserves of 370 000 tons grading 0.137 ounce gold per ton. The property lies along the Pipestone Fault which also hosts the Canamax Resources–Bruneau Mining Corporation Clavos Deposit to the west.

In 1987, a total of 19 holes, 13 622 feet, were drilled on the property. No holes were drilled into the known zone; however, a few holes were drilled along strike to the east and west. No gold values of economic significance were intersected. The drilling was concentrated within the fault zone to explore for a Clavos-type deposit. Scattered, weak gold values were intersected in geology similar to the Clavos Zone (Bruneau Mining Corporation, personal communication, 1987).

Moneta Porcupine Mines Limited

Moneta Porcupine Mines Limited completed 250 reverse circulation drill holes on Hollinger patented claims just to the north of the central part of Tisdale Township. Ten trenches were dug. Diamond drilling in this area, and on the Bergeron-Rousseau option in Murphy Township, totalled 25 497 feet in 36 holes (W. MacRae, Geological Consultant, personal communication, 1987).

United Kingdom Energy Incorporated

Fourteen reverse circulation holes were drilled on claims which include the Triple Lake gold property in

McArthur Township. Six diamond-drill holes totalling 3430 feet were also completed. Two of these holes were drilled near the Triple Lake Shaft and four were drilled into a coincident electromagnetic and gold geochemical anomaly, 4000 feet west of the shaft. The conductor was found to be a broken-up fault zone in mafic volcanic rocks. An adjacent 250-foot wide silica flooded zone, with at least two different ages of quartz deposition and containing mafic volcanic fragments, was also intersected. No economically significant gold assays were intersected in the drilling (W. MacRae, Geological Consultant, personal communication, 1987).

Vital Pacific Resources Limited

In late 1986, Davidson Tisdale Mines Limited acquired control of Vital Pacific Resources Limited. The latter company then purchased the Kinch Property located just to the northwest of the Davidson Tisdale Property in Tisdale Township. The company completed ten, surface diamond drill holes totalling 993.5 m on the property in 1987 (Davidson Tisdale Mines Limited, personal communication; The Northern Miner, October 20, 1986).

Gowest Amalgamated Resources Limited–Jonpol Explorations Limited

The joint venture partners drilled 25 holes totalling 20 059 feet on their property in Denton Township. Eighteen of these holes were drilled in and around the known gold occurrence. Two holes were drilled to test a VLF conductor and five holes were drilled to test shear zones outlined by magnetic surveys. Three different gold zones exist as sulphide lenses within carbonatized mafic tuffs which are surrounded by talc-carbonate altered ultramafic rocks (Gowest Amalgamated Resources Limited, personal communication, 1987).

Canadian Nickel Company Limited (Canico)

Canico, the exploration arm of Inco Limited, conducted two programs of reverse circulation drilling on their claims in Eldorado and Langumuir Townships (Canico, personal communication, 1987).

HSK Minerals Limited

A 2756-foot drill program consisting of 12 holes was carried out on the company's property in English and Beemer Townships in 1987. Gold values were intersected in silicified sections of a wide shear zone which has a minimum strike length of 3000 feet. Another drill program is planned for 1988 (The Northern Miner, December 7, 1987; HSK Minerals Limited, personal communication, 1987).

Delbridge Mines Limited

Delbridge Mines Limited conducted geophysical surveys, trenching, and diamond drilling on the Desantis gold property in Turnbull Township. The underground workings were dewatered in 1986; however, the 1987 program concentrated on other targets on the property. Gold values over narrow widths were reported to have been intersected in the drilling. Gold values were reported in an 18-foot wide quartz vein uncovered during a stripping program (The Northern Miner, various articles, 1987).

Highwood Resources Limited

Highwood Resources Limited drilled five diamond-drill holes in late 1987, on the Croxall Option in Bristol Township, to evaluate an occurrence of rare earth elements (R. Bald, Geological Consultant, personal communication, 1987).

Consolidated Thompson–Lundmark Gold Mines Limited

Seventeen reverse circulation drillholes and six diamond-drill holes (350 feet total) were drilled on the company's four patented claims in the north half of Lot 1, Concession V, Tisdale Township, in late 1987. This followed a program of line cutting and geophysical surveying (E. Van Hees, Geological Consultant, personal communication, 1987).

Bongold Mining Limited (K-3 Development Corporation)

Three diamond-drill holes totalling 2000 feet were drilled on Bongold Mining Limited's claims at the mutual corners of Mountjoy, Jessop, Jamieson, and Godfrey Townships (E. Van Hees, Geological Consultant, personal communication, 1987).

GOLD FIELDS CANADIAN MINING LIMITED

One 1000-foot hole was drilled in late 1987, by Gold Fields Canadian Mining Limited in the northeast quarter, south half of Lot 1, Concession IV, Tisdale Township, to obtain geological data. The hole was drilled after a program of line cutting and geological mapping (Gold Fields Canadian Mining Limited, personal communication, 1987)

Diepdaume Mines Limited

A 998-foot diamond-drill hole was drilled by Diepdaume Mines Limited in Cody Township on the Evans option (Diepdaume Mines Limited, personal communication, 1987).

Honcho Gold Mines Limited

A 5000-foot diamond-drill program was started by Honcho Gold Mines Limited in December, 1987, on a 22-claim block in Bristol Township, optioned from R. Allerston. A geophysical program had been completed previously (Hlava and Laforest, Geological Consultants, personal communication, 1987; The Northern Miner, September 28, 1987).

Mill City Gold Incorporated

Mill City Gold Incorporated completed eight diamond-drill holes (5000 feet total) on the Loki Resources Limited property in Deloro Township in 1987. Geological mapping and rock geochemistry was also done. Loki Resources Limited amalgamated with Mill City Gold Corporation to form Mill City Gold Incorporated. Pamour Incorporated holds an option on the property (E. Van Hees, Geological Consultant, personal communication, 1987).

Porcupine Balmoral Resources Limited

A diamond-drill program consisting of 3500 feet was completed on their property in Adams Township (Staff Geologist's Files, Resident Geologist's Office, Timmins)

Priority Metals and Minerals Corporation

In late December, 1986, and early January, 1987, Priority Metals and Minerals Corporation completed two diamond-drill holes (570 feet) on their property in Lots 4 and 5, Concession VI, Whitney Township. Metasediments containing nothing of economic significance were intersected (W. Mosler, Geological Consultant, personal communication, 1987).

Legion Resources Limited

Legion Resources drilled four diamond-drill holes on the company's claims south of Kamiskotia Lake in Robb Township. Nothing of economic significance was intersected (R. Vanigen, Geological Consultant, personal communication, 1987).

The Lithium Corporation of Canada Limited

The Associated Porcupine Property, southeast of Porcupine Lake in Whitney Township, was optioned from Noranda Exploration Company Limited by The Lithium Corporation of Canada Limited. A 300-foot diamond-drill program was started in late 1987, and will continue into 1988. Gold exploration is the focus of the program (M.P.H. Consulting Limited, personal communication, 1987).

Eldor Resources Limited

Eldor Resources is earning an interest in the Puissance gold property in Deloro Township from a numbered Ontario company controlled by the Northfield Group. The interest is being earned by operating an exploration program on the property. In 1987, a program consisting of detailed geological mapping and channel sampling was done. The program will continue into 1988 (Eldor Resources Limited, personal communication, 1987).

During February, 1987, an airborne geophysical survey was flown over the property of Eldor Resources Limited in the southeastern corner of Rykert Township. Golden Trio Minerals Limited, who optioned the property, carried out the survey for an undisclosed interest in the property. Magnetic and VLF-EM data was collected on a 37.8 km grid on the 27-claim property (Eldor Resources Limited, personal communication, 1987).

Musto Explorations Limited

Musto Explorations Limited has acquired the property over the Nemegosenda Lake carbonatite complex in Collins and Chewett Townships, from Chevron Canada Resources Limited. In 1987, the company conducted survey work, aerial photography and airborne geophysical surveys over the property. A major program on the property will begin in January, 1988. Evaluation of known occurrences of rare earth elements and exploration for others will be the purpose of the program (Musto Explorations Limited, personal communication, 1987).

Gerald Boissonneault Property

A program of bulldozer stripping was carried out in areas of shallow overburden in late 1987, by G. Boissonneault on his claims in the south half of Lots 1 and 2, Concession I, Matheson Township. A possible eastern extension of the Pamour No. 1 Mine gold-bearing conglomerate and greywacke horizon is the exploration target (Gerald Boissonneault, Prospector, personal communication, 1987).

Kaphearst Resources Limited

A geological mapping and prospecting program was conducted on the Kaphearst Property during the summer of 1986. The 2792-claim property, located 30 miles south of Hearst, Ontario, covers all or parts of Caithness, Roche, Franz, Scholfield, Talbott, and Ebbs Townships. During the summer of 1987, an overburden drilling program and ground geophysical surveys were carried out on selected parts of the property (R.S. Middleton Exploration Services Incorporated, personal communication, 1987).

Astralia Resources

An exploration program consisting of line cutting, VLF, and magnetic surveys, geological mapping, and rock and selective soil sampling was completed on the Astralia property in November, 1986. The 109-claim property is located approximately 50 km southwest of Kapuskasing, Ontario, in the southeast corner of Fergus Township (Assessment Files, Resident Geologist's Office, Timmins).

Golden Trio Minerals Limited

In November, 1986, an airborne geophysical survey was carried out on the 268-claim property of Golden Trio Minerals in Opasatika, Fergus and Ecclestone Townships. A total of 393 line-kilometres of data was collected.

In January and February, 1987, airborne magnetic and VLF-EM geophysical surveys were flown over four separate claim blocks of Golden Trio Minerals. A total of 3244.26 line-kilometres of data was collected from the 2350-claim property in Ecclestone, Fergus, Parnell, Opasatika, Caithness, Rykert, and Abbott Townships. On their 117-claim property in Templeton Township, 159.0 line-kilometres of data was collected while 1753.25 line-kilometres of data was collected from their 1255-claim property in Pelletier, Roche and Scholfield Townships. A total of 2234.51 line-kilometres of data was collected from Golden Trio Minerals' 1612-claim property in Legge, Marjorie, Minnipuka, and Walls Townships.

During the fall of 1987, a helicopter-supported geological mapping and prospecting program was conducted on the Golden Trio Property in Ecclestone, Fergus and Opasatika Townships. Overburden drilling and diamond drilling is also being conducted on selected areas of the property (R.S. Middleton Exploration Services Incorporated, personal communication, 1987).

Westmin Resources Limited

Westmin Resources Limited completed a 2000 m, 13-hole drilling program in January, 1987, on their Sunday Lake property. Ground geophysical surveys consisting of magnetic, VLF and Max–Min II electromagnetic surveys were completed on Westmin Resources' 13-claim Lower Detour Lake property in February, 1987 (Westmin Resources Limited, personal communication, 1987).

Homestake Consulting

During the period of October 6 to 17, 1986, a combined airborne magnetic and VLF–electromagnetic survey was flown over the Homestake Property. A total of 1856 km of survey lines were flown over the 971-claim property in Caithness, Pelletier and Doherty Townships (Assessment Files, Resident Geologist's Office, Timmins).

Maurex Resources Limited

During the period from April 17 to April 30, 1987, a VLF–electromagnetic geophysical survey was conducted on the Walls Township property of Maurex Resources. The survey on the property, which consists of two blocks, of nine and twelve claims respectively, detected several significant anomalies (Assessment Files, Resident Geologist's Office, Timmins.)

Comstate Resources Limited

Comstate Resources Limited completed a stripping, geological mapping, and channel sampling program on their property in McCowan Township during August, 1987 (Staff Geologist's Files, Resident Geologist's Office, Timmins).

Carlson Mines

Company officials provided a tour of the Kipling Township kaolin-silica property to a three-person delegation from Englehard Corporation, in December, 1986. Englehard Corporation has a kaolin mining operation in Georgia, and is looking for an increased supply of kaolin for the paper coating industry. A 50-pound sample from the test pit stockpile was collected for analytical work. Carlson Mines has commissioned a final feasibility study on the deposit.

The deposit hosts estimated reserves of 63 million tons (Northern Miner, March, 1987).

OTHER EXPLORATION PROGRAMS

Unigold Resources Limited conducted diamond drilling in Bond and Sheraton Townships, around an old zinc occurrence.

Lac Minerals Limited undertook ground geophysical surveys and geological surveys in Langmuir, Fallon, Sheraton and Clergue Townships.

Bankers Petroleum Limited performed line cutting, geological mapping, trenching, and sampling in Turnbull and Godfrey Townships.

Canper Resources Limited, Gallager Resources Limited and Goldhunter Explorations Limited carried out overburden drilling in Hoyle and Gowan Townships.

Goldhurst Resources Limited performed geophysical surveys in Turnbull Township.

Gyro Capital Incorporated explored in Shaw and Ogden Townships.

Imperial Platinum Corporation explored for platinum in Reaume Township.

Seeley Lake Resources Incorporated carried out stripping and trenching in the northern part of Shaw Township.

Quote Resources Limited and Shoreacres Exploration Limited carried out stripping in Sothman Township.

Tri–Con Resources Limited explored on two patented claims on the western part of the south half of lot 12, concession II, Matheson Township.

Stockgold Resources Limited conducted overburden drilling in the eastern part of Stock Township.

B.A. Ellies did trenching and sampling on his patented claims in Tisdale Township.

Fred Harvey did trenching in Deloro Township.

Len Hill prospected in Mann Township.

Dave Meunier prospected in Carman Township.

Doug Moorish prospected in Fallon Township.

Ed Colbert carried out diamond drilling on his claims in Denton Township.

TABLE 10.6 MAPS AND REPORTS PERTAINING TO THE PORCUPINE NORTH AND PORCUPINE SOUTH RESIDENT GEOLOGISTS' AREAS PUBLISHED DURING 1986 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Final Reports

Rpt 248	Geology of the Garnet Lake Area

Open File Reports

OFR 5631	Peat and Peatland Resources of Northeastern Ontario
OFR 5645	Exploration Technology Development Fund, Grant No. 068: Isotope Ratios and Trace Elements in Gold and Base-Metal Occurrences in Ontario
OFR 5651	A Bibliography of the Huronian Supergroup:1821-1987
OFR 5653	Analytical Methods, Quality Control Data, and Previously Unpublished Geochemical Results: Reconnaissance Till Sampling Program, Matheson Area
OFR 5669	Exploration Technology Development Fund, Grant No. 090: The Use of Direct Lake Sediment Geochemical Sampling for Gold as a Reconnaissance Precious Metal Exploration Tool in the Canadian Shield: Preliminary Results
OFR 5670	Exploration Technology Development Fund, Grant No. 097: Gold in Peat and its Relevance to Mineral Exploration
OFR 5674	Ontario Geoscience Research Grant Program, Grant No. 260: Magnetotelluric Mapping of the Destor-Porcupine Fault
OFR 5677	Komatiite Database

Studies

Study 33	Geology of Carbonatite-Alkalic Rock Complexes in Ontario: Borden Township Carbonatite Complex
Study 34	Geology of Carbonatite-Alkalic Rock Complexes in Ontario: Nemogosenda Lake Alkalic Rock Complex
Study 35	Geology of Carbonatite-Alkalic Rock Complexes in Ontario: Shenango Township Alkalic Rock Complex
Study 42	Geology of Carbonatite-Alkalic Rock Complexes in Ontario: James Bay Lowlands
Study 53	Geology of Carbonatite-Alkalic Rock Complexes in Ontario: "Carb" Lake Carbonatite Complex

Mineral Deposits Circulars

MDC 26	Industrial Minerals of Northern Ontario

Mineral Policy Background Papers

MPBP 24	Review of Platinum Group Element Deposits in Ontario

Miscellaneous Papers

MP 134	Report of Activities, 1986, Regional and Resident Geologists
MP 136	Geoscience Research Grant Program, Summary of Research, 1986-1987
MP 137	Summary of Field Work and Other Activities, 1987

Preliminary Maps

P.3097	Gold Grains in Sonic Drill Core Samples (1987) from the Lake Abitibi-Matheson Area

Open File Maps

OFM 89	Geology of Whitney Township
OFM 90	Geology of the Lower Detour-Hopper-Sunday Lakes Area
OFM 100	Platinum Group Element Studies--The Abitibi Greenstone Belt

TABLE 10.6 Continued

Coloured Maps

Map 2221 (Reprint)	Chapleau-Foleyet Sheet, Geological Compilation Series
Map 2503	Cunningham and Garnet Townships
Map 2504	Benton and Mallard Townships
Map 2505	Mines and Minerals Division Administrative Areas and Offices
Map 2506	Geological Highway Map, Northern Ontario
Map 2518	Surficial Geology of Northern Ontario

Geophysical/Geochemical Series Maps

Map 80889	Sonic Drillhole 85-54, Sheraton Township
Map 80890	Sonic Drillholes 85-55 and 85-56, Sheraton and Egan Townships
Map 80892	Sonic Drillhole 85-58, Bond Township

Geological Data Inventory Folios

GDIF 383	Geological Data Inventory of Bond Township
GDIF 400	Geological Data Inventory of Clergue Township
GDIF 402	Geological Data Inventory of Sheraton Township

Geological Survey of Canada Publications--Open Files

OF 1356	Regional Lake Sediment and Water Geochemical Reconnaissance Data, Province of Ontario (41 J)
OF 1357	Regional Lake Sediment and Water Geochemical Reconnaissance Data, Province of Ontario (41 O)

11. Kirkland Lake Resident Geologist's Area—1987

G. Grabowski[1], H.L. Lovell[2], D. Guindon[3], and A. Bath[4]

[1]Acting Resident Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[2]Regional Staff Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[3]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[4]Economic Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

INTRODUCTION

The year 1987 marked two major changes at the Kirkland Lake Resident Geologist's Office. In June, Howard Lovell was appointed Regional Staff Geologist and started work on a Matachewan to Larder Lake Gold Study. Gary Grabowski was appointed Acting Resident Geologist from June 22, 1987 to January 6, 1988. Gerhard Meyer was appointed Resident Geologist commencing January 7, 1988.

On February 16, the Mining Division boundaries were changed and the Resident Geologist's areas were adjusted accordingly. The Shining Tree, Gowganda, Elk Lake, and Englehart areas became part of the Cobalt Resident Geologist's area. These changes are illustrated in Figure 11.2. As a result, assessment files from the Kirkland Lake Office for 83 townships, were sent to the appropriate Resident Geologists' Offices. Although this office relinquished 36 percent of the area of its former jurisdiction, only five percent of exploration activity took place in the area given up since most of it is composed of the Bear Island Caution.

The Larder Lake Mining Division continues to display a high rate of activity with 6742 new claims recorded in 1987, to bring the total active claims to 27 146 as of December 31, 1987.

Total assessment work recorded in 1987, amounted to 600 221 man-days (*see*Table 11.1).

The Explore Report, produced by the Mineral Analysis and Statistics Section of the Ministry of Northern Development and Mines, is a report of all physical work and surveys performed in Ontario in 1986. In the Kirkland Lake Resident Geologist's area, general exploration expenditures amounted to $15 634 017, an increase of over $2.5 million from 1985 (Mancini 1987). This figure represents 16 percent of the Ontario total, as it did in 1985. Value of produced barite, copper, gold, iron ore, sand and gravel, serpentine filler, and silver in the Larder Lake Mining Division, during 1985, was $137 378 746 (Gartley 1987).

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

Permanent staff at the Kirkland Lake Resident Geologist's Office includes: Gary Grabowski, Acting Resident Geologist; Faye M. Boucher, Administrative Secretary; Howard Lovell, Regional Staff Geologist; David Guindon, Drill Core Library Geologist; and Marc Gaudreau, Drill Core Library Assistant.

Todd Beckett, Data Geologist, worked on contract for 11 months. Uttam Kalicharran worked as geological assistant under the Experience '87 program. Gwen Fildes and Kim Antler continued The Northern Miner microfilm project under the Canada–Ontario Unemployment Insurance Section 38 Job Creation Program. Mike Woods also compiled Data Folio maps on the Section 38 Program and was subsequently hired on a six-month contract to assist the Regional Staff Geologist.

The Operation Black River–Matheson (BRiM) project employed Alex Bath, Economic Geologist, Bruce Schell and Dave Mimeault, geological assistants and Pamela Savario as BRiM Secretary. The Black River–Matheson Data Folio project ended on March 31.

With regret we note the sudden death, on May 1, 1987, of Kamal Kalicharran, who had worked on the BRiM Data Folio Project for the last three years. His work on this project, and his voluntary contributions in applying remote-sensing data to interpret geological structure, have enhanced our knowledge of the Black River–Matheson area.

1987 was another busy year for the Kirkland Lake Resident Geologist's staff, which responded to more than 2300 office consultations. Field trips showing the local geology and mineral deposits were provided to exploration company geologists, government and academic representatives, as well as geologists from China and Finland.

A considerable amount of time was spent by Gary Grabowski on the Mining Hazard Abatement Program. The Ministry of Northern Development and Mines provided over $2 million to be shared by the Municipalities of Cobalt, Kirkland Lake, and Timmins to evaluate and reduce the hazards presented by abandoned mines. About $700 000. of this was allocated to the Town of Kirkland Lake. Work completed this year for the Town of Kirkland Lake included drill testing the thickness of surface pillars to determine potential hazards. Three stopes (two on the Wright–Hargreaves property and one on the Sylvanite property) were subsequently capped with concrete bulkheads.

At the request of the Elk Lake District Chamber of Commerce, a project was started to locate and evaluate the mining hazards in the Gowganda–Elk Lake–Matachewan area. This work is being done by the Ministry of Natural Resources, Kirkland Lake District, and an Unemployment Insurance Section 38 Job Creation Program.

A number of active prospects were visited by the Resident Geologist, Regional Staff Geologist and Black River–Matheson Economic Geologist. Assessment work representing 600 221 man-days was added to the Resident Geologist's Assessment File Library, and 325 articles obtained mainly through the Ontario Geological Survey Mines Library were added to the Technical Library.

A number of kimberlite boulders were collected from gravel pits near Larder Lake, including a sample

TABLE 11.1

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1987	6,742	3,854	27,146	197,727	319,836	17,872	600,241
1986	6,973	6,787	24,160	107,108	399,511	48,263	631,038
1985	7,558	5,011	23,974	95,076	276,646	19,517	460,183
1984	7,943	4,492	21,397	93,946	245,542	44,113	473,820
1983	8,354	3,866	17,946	121,213	98,366	15,233	304,770
1982	3,253	5,218	13,458	99,526	133,511	17,926	313,690
1981	5,498	2,697	15,423	69,906	125,459	19,536	247,087
1980	6,299	1,834	12,622	64,454	115,031	10,981	209,357
1979	4,261	1,452	8,157	29,714	25,352	4,990	68,763
1978	1,710	2,065	5,248	32,602	38,100	8,887	87,144
1977	1,826	2,334	5,703	37,101	45,436	1,820	98,992
1976	2,350	2,979	6,712	47,724	42,338	6,220	102,936
1975	2,916	5,010	7,341	45,880	38,047	6,738	98,624
1974	4,757	2,296	9,435	40,678	55,716	4,441	110,165
1973	3,260	3,214	6,974	34,113	35,811	8,150	92,616
1972	3,253	4,740	6,781	39,371	52,351	3,358	106,026
1971	4,065	3,846	8,268	29,433	48,785	4,764	96,047
1970	4,315	3,704	8,049	25,683	28,683	4,133	73,157
1969	3,404	5,273	7,438	50,892	45,713	15,829	130,185
1968	4,171	7,909	9,307	74,649	82,637	5,799	180,437
1967	5,450	7,341	13,045	79,172	29,073	4,032	143,600
1966	7,606	11,101	14,936	117,544	30,971	8,050	182,352
1965	9,331	6,906	18,431	123,129	88,259	6,530	257,029
1964	12,842	3,884	22,912	77,807	32,644	11,725	149,198
1963	4,710	3,895	13,954	95,696	16,241	4,226	138,627
1962	4,675	4,028	13,139	63,003	5,494	5,099	97,219
1961	3,749	4,451	12,492	47,862	5,494	1,118	79,219
1960	5,024	6,747	13,194	75,123	7,296	4,751	104,632
1959	6,419	5,594	14,917	22,947	3,792	1,404	80,322
1958	8,582	7,108	14,902	37,381	7,481	1,941	66,783
1957	4,664	8,212	12,618	95,934	12,593	3,948	139,891
1956	9,673	3,594	16,166	77,879	20,982	6,693	130,894
1955	4,182	3,999	10,087	75,561	3,389	3,529	105,925

of hypabyssal kimberlite weighing over 25 kg, from which C.F. Mineral Research Limited of Kelowna, British Columbia, will extract zircons for age dating. A limestone inclusion submitted to the Geological Survey of Canada's Paleontology Section yielded conodonts indicative of a Middle Ordovician to Middle Devonian age. Similar ages were determined for limestone inclusions in the Nickila Lake kimberlite pipe (discovered by Monopros Limited in 1984) in Bisley Township, southwest of Esker Lake Provincial Park.

On April 24, 1987, over 250 people attended a Core Shack Seminar held in Kirkland Lake that was jointly sponsored by the Kirkland Lake Resident Geologist, the Kirkland Lake Department of Economic Development and Tourism, and the Kirkland Lake Branch of the Canadian Institute of Mining and Metallurgy. Twenty-five companies displayed drill core from their active exploration projects and ten of the companies presented short talks on their respective activities.

Mineral potential studies were done for proposed access roads, forfeited lands, and a River Management plan for Edwards Creek (near Iroquois Falls).

MINING ACTIVITY

There were eight producing mines in the Kirkland Lake Resident Geologist's Area (*see* Figure 11.1) during 1987—five gold mines, one iron mine, one barite mine, and a serpentine filler mine. Two shafts were sunk, six decline ramps driven, and three shafts dewatered, all in preparation for underground exploration and in anticipation of eventual production. There are presently three gold mills under construction. Total production of all gold mines in the Kirkland Lake Resident Geologist's Area is shown in Table 11.2.

In April 1987, Giant Yellowknife Mines Limited acquired the assets of Pamour Porcupine Mines Limited and is now the operator of the Ross Mine in Holtyre. An underground exploration program is presently underway to determine if shaft deepening to over 4000 feet from its present depth of 3300 feet is warranted. Planned production for 1987 is 250 000 tons grading 0.118 ounce gold per ton.

Golden Shield Resources Limited purchased the Kerr Addison Mine and its surrounding properties for $38 million. The name of the mine was changed to the Kerr Mine. Renewed exploration is underway at the Kerr Mine in order to increase reserves now at 561 000 tons averaging 0.130 ounce gold per ton (Northern Miner, November 9, 1987).

Golden Shield Resources Limited shut down the Mirado Mine in the summer after extracting 50 000 tons of ore from an open pit and 20 000 tons from underground. The ore was milled at the Inco--Queenston McBean mill in Dobie. Milled grades were in the 0.12 to 0.17 ounce gold per ton range instead of the average drill-indicated grade of 0.34 ounce gold per ton.

Lac Minerals Limited closed down the Lake Shore project after recovery of the crown pillar was complete. An underground exploration program using the No.5 shaft failed to indicate the presence of sufficient reserves to support a viable mining operation. Lac Minerals Limited signed a deal with Newfields Minerals Incorporated whereby Newfields would use the Lake Shore No.5 shaft to access the "Narrows Break" on the adjoining Teck Hughes property.

Construction of a new $13 million mill is underway at the Lac Minerals Limited Macassa mine. The capacity of the new mill is to be 1250 tons per day, with 500 tons per day expected to be provided from

TABLE 11.2 Gold production from all mines in Ontario's Larder Lake Mining Division to end of 1986 (compiled by Kirkland Lake Resident Geologist office):

Mine	Township	Tons Milled	Production		Grade	Yrs. of
			(oz. Au)	(oz. Ag)	(oz Au/T)	Production
Aljo	Beatty	2,333	42	5	0.02	1940
American Eagle	Munro	60	40	nil	0.67	1911
Argyll	Beatty	25	30	nil	1.20	1918
Ashley	Bannockburn	157,076	50,123	7,644	0.32	1932-1936
Baldwin	Eby	81	43	81	0.53	1929,1938
Barry Hollinger	Pacaud	267,741	77,000	8,502	0.26	1918,25-36,44-46
Bidgood	Lebel	586,367	160,184	72,468	0.27	1934-51
Blue Quartz	Beatty	500	81	33	0.16	1923,26,28,34
Bourkes	Benoit	1,298	277	50	0.21	1918,36-38
Canadian Arrow	Hislop	279,593	17,045	nil	0.06	1980-1983
Cathroy Larder	McElroy	22,250	3,227	993	0.15	1941-44,47,57
**Centre Hill	Munro	327,007	422	36,883	.001	1967-1970
Chesterville	McGarry	3,260,439	358,880	19,371	0.11	1930-1952
Croesus	Munro	5,333	14,859	1,423	2.79	1915-18,23,31-36
**Ethel Copper	James	8,500	69	2,484	0.01	1962-1967
Gateford (Swastika)	Teck	103,684	30,068	nil	0.29	1910-1947***
Golden Summit	Maisonville	737	57	nil	0.08	1936-37,45
Gold Hill	Catharine	4,616	660	nil	0.14	1927-28
Gold Pyramid	Guibord	175	36	nil	0.21	1911
Hudson-Rand	Teck	6,496	483	143	0.07	1922
*Kerr Addison	McGarry	37,943,899	10,226,288	568,686	0.27	1911,1938-
Kerr Addison (Murphy)	Garrison	70,000	9,000	nil	0.12	1981
Kirkland Lake	Teck	3,140,283	1,172,955	130,579	0.37	1916-1960
Kirkland Townsite	Teck	4,230	1,921	168	0.45	1958-1959
Laguerre	McVittie	40,514	7,568	1,383	0.19	1937-1939
*Lake Shore	Teck	17,064,283	8,559,668	1,955,132	0.51	1918-65,1982-87
*Macassa	Teck	6,157,835	2,700,297	425,417	0.44	1933-
Matachewan Consolidated	Powell	3,525,200	378,101	133,210	0.11	1934-1954
Miller Independence	Pacaud	31	59	70	1.90	1918
Moffat-Hall	Lebel	16,388	4,780	1,149	0.29	1934-1935
Morris Kirkland	Lebel	127,253	16,999	29,754	0.13	1936-38,40-42
New Telluride	Skead	104	62	50	0.60	1931-1932
Omega	McVittie	1,615,081	214,098	29,290	0.13	1913,26-28,36-47
Oueenston	Gauthier	1,054	177	2,380	0.17	1941
Oueenston-INCO (McBean)	Gauthier	557,621	45,900	nil	0.08	1984-1986
Ronda	MacMurchy	24,592	2,727	4,830	0.11	1939
*Ross	Hislop	6,258,000	952,876	1,544,795	0.15	1936-
**Ryan Lake	Powell	184,790	1,352	36,141	0.01	1948-57,62-64
Stairs	Midlothian	15,835	3,573	1,767	0.23	1965-1966
Sylvanite	Teck	5,049,536	1,674,808	337,956	0.33	1927-1961
Teck Hughes	Teck	9,565,302	3,709,007	501,657	0.38	1917-1968
Toburn	Teck	1,186,316	570,659	135,238	0.48	1912-1953***
Tyranite	Tyrrell	223,810	31,352	4,860	0.14	1939-1942
Upper Beaver	Gauthier	580,562	140,709	59,167	0.24	1913-1972***
Upper Canada	Gauthier	4,648,984	1,398,291	589,696	0.30	1938-1971
White-Guyatt	Munro	50	10	nil	0.20	1911
Wright Hargreaves	Teck	9,934,327	4,821,296	853,643	0.49	1921-1965
Young-Davidson	Powell	6,213,272	585,690	131,939	0.10	1934-1957
Total		119,133,932	37,913,771	7,536,619	0.32	

*Producer in 1986
**Base Metal Mine
***Intermittent Production

underground production. The remaining 750 tons per day will be obtained from mine tailings; currently, about 4 000 000 tons averaging 0.07 ounce gold per ton are available for milling.

EXPLORATION ACTIVITY

Exploration activity in the Black River–Matheson area is described in the section on Operation Black River–Matheson by A.C. Bath. A complete list of all assessment work received during 1987 can be found in Table 11.3.

Armistice Resources Limited, at an expected cost of $4 million, have begun rehabilitating the Armistice shaft on the Sheldon–Larder Mines Limited property in McGarry Township, immediately west of the Kerr Mine. An underground exploration program is planned on the 1250-foot level with an option to deepen the shaft from 1275 feet to 4100 feet at an additional cost of $8.3 million. The company expects to intersect the extension of the Kerr Addison orebody at depth.

Canadian Gold Resources Incorporated dewatered and rehabilitated the Kirk Royal (also known as the Conroyal or Queen Lebel) shaft in Lebel Township east of Kirkland Lake. An underground exploration program is underway to determine the nature of the gold mineralization and to verify grades of 0.47 ounce gold per ton over 9 feet obtained during the original development work in the 1930s (Northern Miner, July 13, 1987).

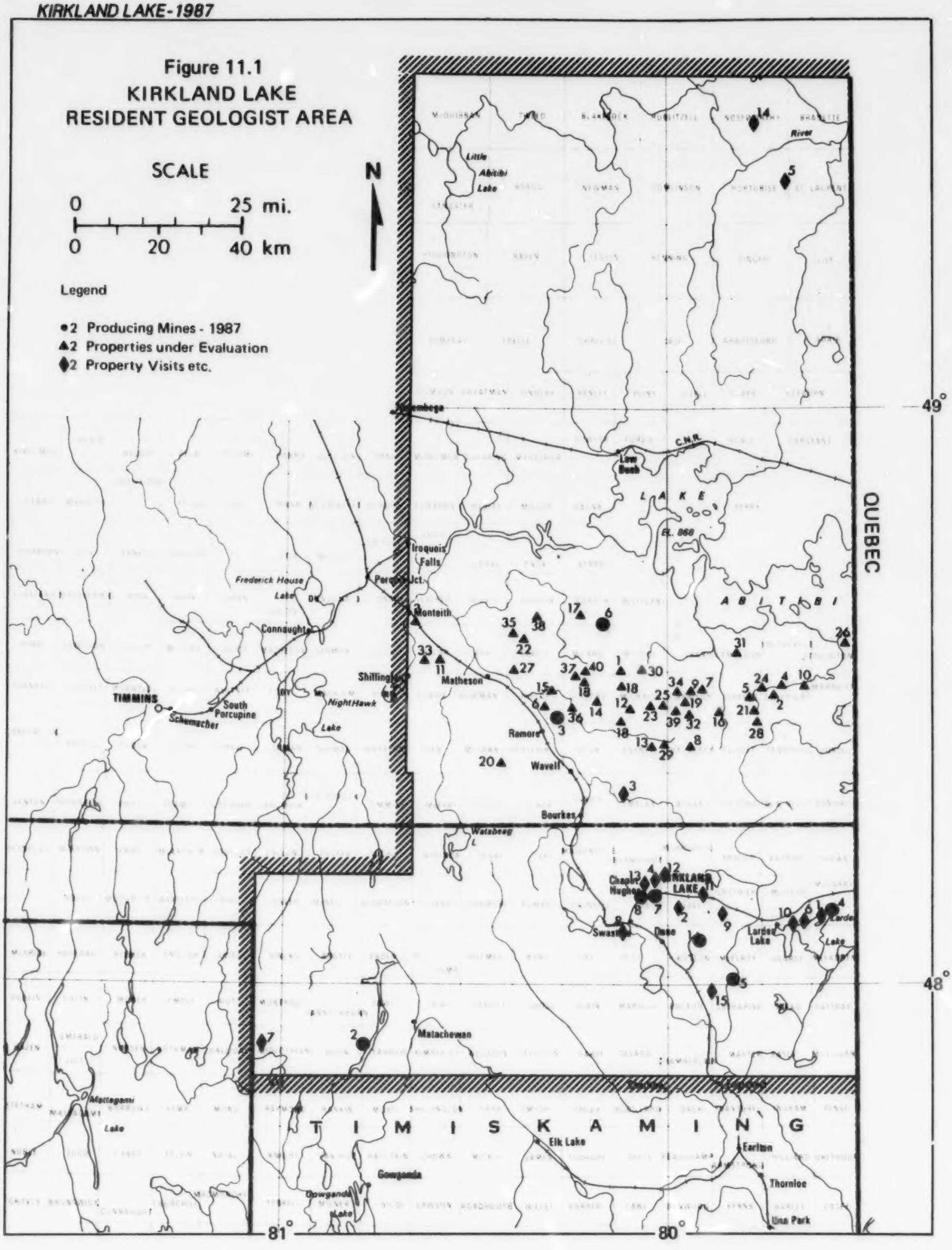


Figure 11.1
KIRKLAND LAKE
RESIDENT GEOLOGIST AREA

SCALE
0
25 mi.
0
20
40 km
N
Legend
●2 Producing Mines - 1987
▲2 Properties under Evaluation
♦2 Property Visits etc.
QUEBEC
49°
48°
81°
80°
Little Abitibi Lake
River
C.N.R.
Low Bush
LAKE
EL. 868
ABITIBI
Iroquois Falls
Porquis Jct.
Frederick House Lake
Monteith
Connaught
TIMMINS
South Porcupine
Schumacher
Shillington
Night Hawk Lake
Matheson
Ramore
Wavell
Bourkes
Watabeag L.
Chaput Hughes
KIRKLAND LAKE
Swastika
Dane
Larder Lake
Matachewan
Mattagami Lake
TIMISKAMING
Elk Lake
Gowganda
Gowganda Lake
Earlton
Thornloe
Una Park

Producing Mines

1.	Dofasco Inc. - Cliffs of Canada Ltd. Adams Mine	Fe
2.	Extender Minerals of Canada Ltd.	Barite
3.	Giant Yellowknife Mines Ltd. Ross Mine	Au,Ag,Cu
4.	Golden Shield Resources Ltd. Kerr Mine	Au,Ag
5.	Golden Shield Resources Ltd. Mirado Mine	Au
6.	Hedman Resources Ltd.	Serpentine Filler
7.	Lac Minerals Ltd. Lake Shore Mine	Au,Ag
8.	Lac Minerals Ltd. Macassa Mine	Au,Ag

Properties Under Evaluation

1.	Armistice Resources Ltd.	Au
2.	Canadian Gold Resources Inc.	Au
3.	Canreos Minerals (1980) Ltd.	Au
4.	Eastmaque Gold Mines Ltd.	Au
5.	Glen Auden Resources Ltd.	Au
6.	Golden Shield Resources Ltd.	Au
7.	Goldteck Mines Ltd.	Au
8.	HSK Minerals Ltd.	Au
9.	Inco Gold - Queenston Gold Mines Ltd.	Au
10.	Lenora Explorations Ltd.	Au
11.	Lytton Minerals Ltd.	Au
12.	Minnova Inc.	Au
13.	Newfields Minerals Inc.	Au
14.	Newmont Exploration of Canada Ltd.	Au
15.	Shenandoah Resources Ltd.	Au

Properties Under Evaluation - Black River-Matheson Area

1.	Ateba Mines Ltd.	Au
2	American Barrick Resources Corp.	Au
3.	Bruneau Mining Corp. - Montclerg Resources Ltd.	Au
4.	Canamax Resources Inc.	Au
5.	Card Lake Resources Ltd.	Au
6.	Chevron Minerals Ltd.	Au
7.	Coastoro Resources Ltd.	Au
8.	Cominco Ltd. - Vanstates Resources Ltd.	Au
9.	Cominco Ltd. - Jonpol Explorations Ltd.	Au
10.	Dickenson Mines Ltd.	Au
11.	Esso Minerals Canada Ltd.	Au
12.	Falconbridge Ltd.	Au
13.	Glimmer Resources Inc.	Au
14.	Golden Shield Resources Inc.	Au
15.	Goldpost Resources Inc.	Au
16.	Grandad Resources Ltd.	Au
17.	Hedman Resources Ltd.	Au
18.	Lacana Mining Corp	Au
19.	Lac Minerals Ltd.	Au
20.	Lencourt Ltd.	Au
21.	Lenora Explorations Ltd.	Au
22.	Maude Lake Gold Mines Ltd.	Au
23.	Moneta Porcupine Mines Ltd.	Au
24.	Newmont Exploration of Canada Ltd.	Au
25.	Noranda Exploration Co. Ltd. - Destiny Resources Ltd.	Au
26.	Nufort Resources Inc.	Au
27.	Pamorex Minerals Inc.	Au
28.	Perrex Resources Inc.	Au
29.	Peter Island Resources Inc.	Au
30.	Placer Dome Inc.	Au
31.	Pronto Explorations Ltd.	Au
32.	Silversides Resources Inc.	Au
33.	St. Andrew Goldfields Ltd.	Au
34.	T & H Resources	Au
35.	Thunder Valley Resources Ltd.	Au
36.	United Reef Petroleums Ltd.	Au
37.	White Guyatt Mining Co. Ltd.	Au
38.	Wilzel Resources Ltd.	Au
39.	Winteroad Resources Ltd.	Au
40.	Wood-Croesus Gold Mines Ltd.	Au

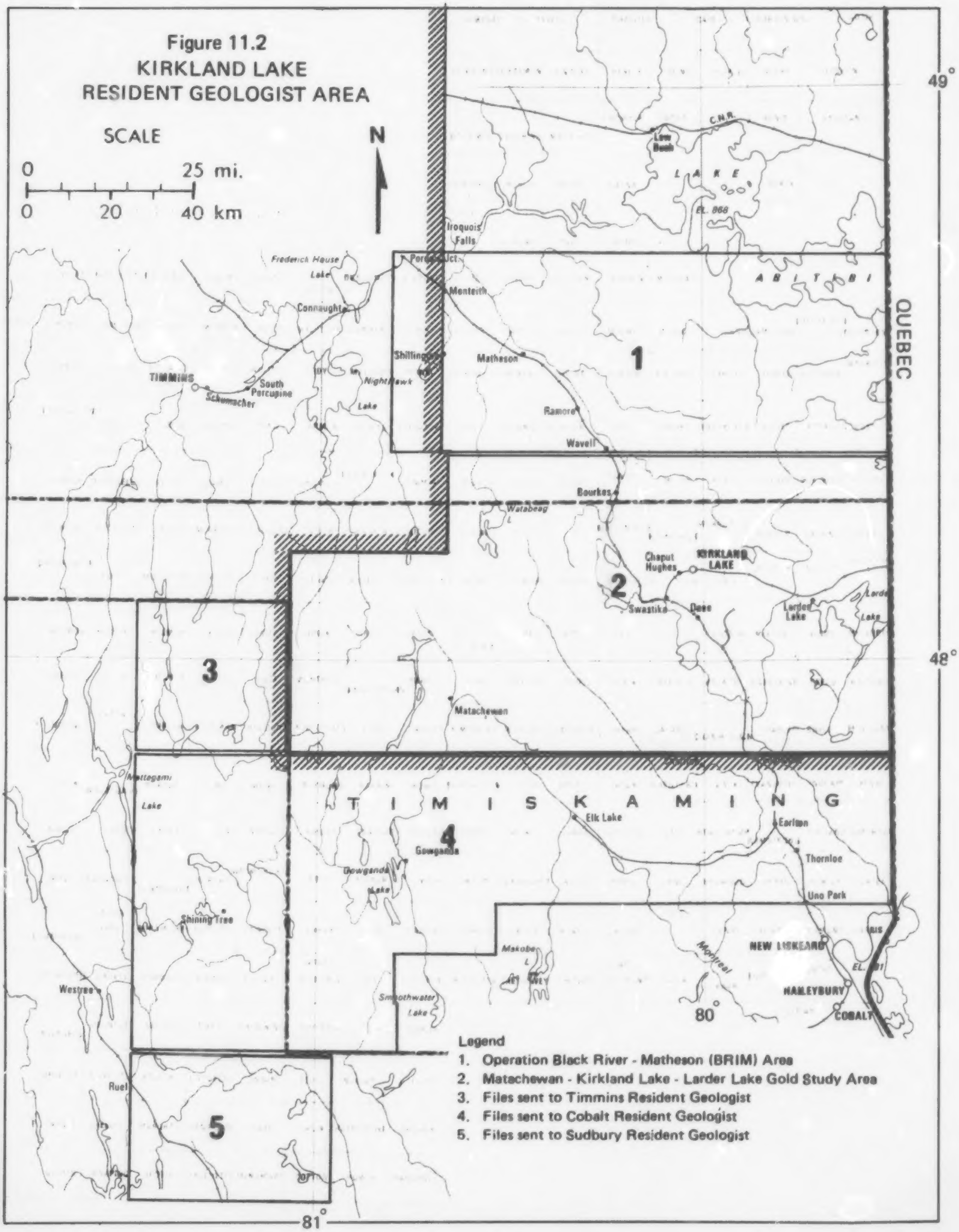


Figure 11.2
KIRKLAND LAKE
RESIDENT GEOLOGIST AREA

SCALE
0
25 mi.
0
20
40 km
N
49°
48°
80°
81°
QUEBEC
C.N.R.
Low Bush
LAKE
ABITIBI
EL. 868
Iroquois Falls
Porquis Jct.
Frederick House Lake
Connaught
Monteith
Shillington
Matheson
TIMMINS
Schumacher
South Porcupine
Night Hawk Lake
Ramore
Wavell
Bourkes
Watabeag L.
Chaput Hughes
KIRKLAND LAKE
Swastika
Dane
Larder Lake
Larder Lake
Matachewan
Mattagami Lake
TIMISKAMING
Elk Lake
Gowganda
Gowganda Lake
Earlton
Thornloe
Uno Park
Shining Tree
Makobe L.
Montreal
NEW LISKEARD
HAILEYBURY
COBALT
EL. 581
Westree
Smoothwater Lake
Ruel
1
2
3
4
5

Legend
1. Operation Black River - Matheson (BRIM) Area
2. Matachewan - Kirkland Lake - Larder Lake Gold Study Area
3. Files sent to Timmins Resident Geologist
4. Files sent to Cobalt Resident Geologist
5. Files sent to Sudbury Resident Geologist

TABLE 11.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM - Airborne Electromagnetic Survey
AMag - Airborne Magnetic Survey
Assess - Assessment Work
Au - Gold
CS - Core Samples
D - Donation
DD - Diamond Drilling
DDR - Diamond Drilling Report
Gc - Geochemical Survey
GL - Geological Survey
GR - Geological Report
HLEM - Horizontal Loop Electromagnetic Survey
IP - Induced Polarization
Mag - Magnetic Survey
OMEP - Ontario Mineral Program
OVD - Overburden Drilling
OVDR - Overburden Drilling Report
PR - Progress Report
Rad - Radiometric Survey
rTr - Rock Trenching
SA - Sampling, Assays
SP - Self Potential Survey
STr - Soil Trenching
T-EM - Time Domain EM
UG - Underground Work
VEM - Vertical Loop Electromagnetic Survey
VLF-EM - Very Low Frequency Electromagnetic Survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Abbotsford Adair, Case Clive, Hepburn Kenning, Singer	32E/04	Canadian Nickel Co. Ltd. "Tri-Township Project"	Au	Assess	AEM	1987	2.9798	
Abbotsford	32E/04	Goldstreet Res. Inc.	Au	Assess	AEM AMag	1987	2.10134	
Abbotsford Adair	32E/04	Minerex Res. Ltd.	Au	OMEP	GL SA	1984	63.4554	
Abbotsford	32E/04	Premier Expl. Inc.	Au	Assess	AMag AEM	1987	2.10059	
Adair	32E/04	Can. Nickel Co. Ltd. "Tri-Township Proj."	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Adair	32D/04	Gold Hill Res. Inc. "Double A Property"	Au	Assess	OVD (57) 1,952'	1987	2.10320	
Adair	32E/04	Minerex Res. Ltd.	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Alma	42A/02	587375 Ontario Ltd.	Au	Assess	STr STr	1986 1987		
Alma Baden	42A/02	Matachewan Indian Reserve No. 72	Au	D D D D D	OVD (25) 1,376' GR AMag AEM VLF-EM Gc GL Gc VLF-EM	1987 1984 1983 1984 1985		
Alma	42A/02	Sunfire Expl. Inc.	Au	Assess	SA	1987	2.10476	
Argyle	42A/02	Kasran Res. Ltd.	Au	Assess	VLF-EM	1987	2.10189	
Argyle	42A/02	McAdam Res. Inc.	Au	Assess	GL	1986	2.10073	
Argyle	42A/02	612378 Ontario Inc. "MacGregor Claims"	Au	Assess	SA	1987	2.9910	
Arnold Katrine	32D/04	Coventry Ventures Inc.	Au	Assess	AMag AEM	1987	2.9828	
Arnold	32D/04	Lac Minerals Ltd. "Grid A 1"	Au	Assess	Mag	1986	2.9839	
Arnold	32D/04	Lac Minerals Ltd. "Grid A 4"	Au	Assess	Mag	1986	2.9838	
Arnold	32D/04	Lac Minerals Ltd. "Grid A 13"	Au	Assess	Mag	1986	2.9841	
Arnold	32D/04	Lac Minerals Ltd. "Grid A 17"	Au	Assess	Mag	1987	2.9842	
Arnold	32D/04	Lac Minerals Ltd. "Grid A 20"	Au	Assess	Mag	1986	2.9843	
Arnold	32D/04	Lac Minerals Ltd. "Grid AM 47"	Au	Assess	Mag	1987	2.10348	
Arnold	32D/04	Link, T; Merrick, A.	Au	Assess	AMag AEM	1986	2.9790	
Arnold Morrisette	32D/04	Monopros Ltd.	Au	OMEP OMEP	IP Mag OVD (7) 1,116'	1985 1984	63.4565 63.4565	
Baden	42A/02	Matachewan Indian Reserve No. 72	SEE	UNDER	ALMA TOWNSHIP			
Baden	42A/02	Obradovich, T.	Au	Assess	STr	1987		
Barnet	42A/08	Glimmer Res. Inc.	Au	Assess	Mag VLF-EM GL	1987	2.9743	
Barnet Michaud	42A/08	Noranda Expl. Co. Ltd. "Barnet A Grid"	Au	Assess	DD (5) 7,437'	1987		
Barnet	42A/08	Noranda Expl. Co. Ltd. "Barnet B Grid"	Au	Assess	DD (4) 2,978'	1987		

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Barnet Thackeray	42A/08	Peter Island Res. Inc.	Au	Assess	DD (1) 366'	1985		
Barnet Cook Guibord Melba Michaud	42A/08	St. Joe Canada Inc.	Au	Assess	IP	1983	2.7681	
Barnet Melba	42A/01 42A/08	Westfield Minerals Ltd. "Pitter Lake Property"	Au	Assess	GL Gc	1986	2.9503	
Beatty Carr, Coulson Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Main Group"	Au	OMEP D OMEP OMEP OMEP OMEP	DD (1) 200' SA UG GR STr SA GL SA OVD (18) 1,396' DD (14) 14,988' IP	1985 1987 1983 1984 1985 1985	63.4478 63.4478 63.4478 63.4478 63.4478	
Beatty Coulson	42A/08 42A/09	Maude Lake Gold Mines Ltd. "N.E. Group"	Au	Assess	VLF-EM Rad	1987	2.9832	
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Salve Lake Group"	Au	Assess	DD (2) 2,150' SA CS	1986 1987	2.9972 2.9975	
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Salve West Group"	Au	Assess OMEP	DD (2) 218' IP	1987 1985	 63.4478	
Beatty	42A/09	Pamour Inc.	Au	Assess	OVD (15) 1,527'	1987	2.10096	
Benoit	42A/08	Jasperson, J.	Au	Assess	VLF-EM SP	1987	2.10428	
Benoit	42A/08	Rodholm, C.	Au	Assess	SA	1986	2.8960	
Benoit	42A/08	Skjonsby, K.	Au	Assess	STr	1986		
Bisley	32D/05	Monopros Ltd.	Au	OMEP OMEP	IP Mag OVD (6) 600'	1984 1984	63.4565 63.4565	
Bisley	32D/05	Tagliamonte, F.	Au	Assess	AEM AMag	1986	2.9622	
Black Playfair	42A/08	Newjay Res. Ltd.	Au	Assess	GL VLF-EM Mag	1986	2.9603	
Blakelock	42H/08	Adola Mining Corp.	Au	Assess	HLEM Mag AEM AMag DD (6) 1,922'	1986 1986 1986	2.9549 2.9775	
Blakelock	42H/08	Deerfoot Res. Inc.	Au	Assess	DD (3) 819'	1986		
Blakelock Hoblitzell Noseworthy	32D/05	Esso Minerals Can. (Esso Res. Can. Ltd.) "HN Prospect"	Au	Assess	OVD (82) 3,418' DD (16) 6,879' AEM	1987 1987 1986	2.10187 2.10071	
Blakelock Bragg Tweed	42H/08	Glen Auden Res. Ltd. "Blakelock-Tweed Twp. Area"	Au	Assess	AEM AMag	1987	2.9796	
Blakelock	42H/08	Goldrock Res. Inc.	Au	Assess	AEM AMag	1987	2.9777	
Blakelock Newman	32E/08	Ingamar Expl. Ltd./ Glen Auden Res. Ltd. "Joint Venture"	Au	Assess	AEM AMag	1987	2.9745	
Blakelock	42H/08	Mineta Res. Ltd.	Au	Assess	AMag AEM	1987	2.9748	
Blakelock Newman	42H/08	Montclerg Res. Ltd./ Glen Auden Res. Ltd. "Floodwood Lake Prop."	Au	Assess	AEM AMag	1987	2.9782	
Blakelock	42H/08	Northfield Minerals Inc.	Au	Assess	AMag AEM	1987	2.9861	
Bompas Grenfell, Lee Maisonville	42A/01	Glen Auden Res. Ltd.	Au	Assess	Mag GL IP	1985	2.9460	
Bompas	42A/01	Kinbauri Gold Corp.	Au	Assess D	DD (1) 300' CS	1986 1987		
Bompas	42A/01	Stewart, A.K.	Au	Assess Assess	GL STr	1987 1987	2.10375	
Bonis Chesney Bay Northeast Bay Purvis, Scapa Steele	32D/13 32E/04 42A/16	Cream Silver Mines Ltd.	Au	Assess	AEM AMag AMag	1986 1986	2.9477 2.9667	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Bonis	32D/13	Del Norte Chrome Corp.	Au	Assess	AEM AMag	1987	2.9686	
Bonis Northeast Bay Steele	32D/13	Utah Mines Ltd. "Lake Abitibi Gold Property"	Au Au	Assess Assess	SA DD (3) 1,935'	1987 1987	2.10246	
Boston	32D/04	Dofasco Inc.	Au	Assess	DD (1) 163'	1987		
Boston Catharine McElroy Pacaud Skead	31M/13 32D/04	Golden Shield Res. Ltd. "Larder Lake Area"	Au	Assess	AEM AMag	1987	2.10293	
Boston Pacaud	31M/13 32D/04	Perron, A.H. "Barry Hollinger Property"	Au	Assess	Mag VLF-EM DD (3) 717'	1987 1987	2.9951	
Boston Catharine McElroy	31M/13 32D/04	Shenandoah Res. Ltd.	Au	Assess	DD (4) 724' STr DD (4) 1,089' STr CS	1986 1987 1987		
Bowman	42A/08	Allerston, R.E.	Au	Assess	Mag	1987	2.10211	
Bowman	42A/08	Placer Dev. Ltd.	Au	Assess	GL Mag VLF-EM	1987	2.9870	
Bowyer Chesney Bay Galna	42A/16	National Mineral Corp.	Au	Assess	AEM-VLF	1987	2.10471	
Bradette	32E/05 32E/12	Canadian Nickel Co. Ltd. "Casa-Berardi Project"	Au	Assess	DD (9) 6,660'	1987		
Bradette	32D/05 32D/12	Dome Expl. (Can.) Ltd. "Bradette Tp. Area"	Au	Assess	AMag AEM	1986	2.9640	
Bradette St. Laurent	32E/05	Goldrock Res. Inc. "Glen Auden Option"	Au	Assess	AEM AMag	1986	2.9776	
Bradette Noseworthy	32E/05 32E/12	Newmont Expl. of Canada Ltd. "Mikwam Property"	Au	Assess OMEP	DD (20) 14,616' SA Gc	1986 1986 1985	 2.9680 63.4616	
Bradette	32E/05	Noranda Expl. Co. Ltd. "1-80"	Au	Assess	DD (4) 986'	1987		
Bradette	32D/05	Noranda Expl. Co. Ltd. "Bradette 1-82"	Au	Assess	OVD (11) 1,518' DD (1) 867' DD (2) 2,371'	1986 1986 1987	2.9572	
Bradette Hurtubise Noseworthy St. Laurent	32E/05	Noranda Expl. Co. Ltd. "Gervais Opt."	Au	Assess	AMag AEM	1987 1987	2.9854 2.10159	
Bradette Hoblitzell Hurtubise Noseworthy St. Laurent Tomlinson	32E/05 32E/12	Noranda Expl. Co. Ltd. "Kabika Prop."	Au	Assess	AMag	1987	2.10107	
Bradette	32D/12	Perrex Res. Ltd. "Group 1"	Au	Assess	AEM AMag	1987	2.9697	
Bradette	32D/12	Perrex Res. Ltd. "Group 2a & 2b"	Au	Assess	AEM AMag	1987	2.9697	
Bradette	32E/12	Sunburst Expl. Ltd.	Au	Assess	AMag AEM	1987	2.9930	
Bragg Newman	42H/08	Casau Expl. Ltd.	Au	Assess	AMag AEM VLF-EM Mag	1987 1987	2.9849 2.9989	
Bragg	42H/08	Glen Auden Res. Ltd. "Blakelock-Tweed Twp. Area"	SEE	UNDER	BLAKELOCK TOWNSHIP			
Bragg Newman	42H/08	Shoal Petroleum Ltd.	Au	Assess	Mag HLEM Mag	1987 1987	2.9787 2.10398	
Burt Holmes	42A/01	Chevron Minerals Ltd.	Au	OMEP Assess	OVD (1) 27' DD (2) 397' Gc SA	1984 1986 1987	63.4595 2.10096	
Cairo	41P/15	Bernatchez, R.A.; Bernatchez, G.	Au	Assess	AEM	1986	2.9665	
Cairo	41P/15	Biralger Res. Ltd.	Au	Assess	STr GL SA	1986 1987	 2.9999	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Cairo	41P/15	Comstate Res. Ltd. "Montreal River Property"	Au	OMEP	IP	1984	63.4495	
Cairo	42A/02	Comstate Res. Ltd. "Moyneur Lake Prop."	Au	OMEP Assess	IP SA	1984 1987	63.4495 2.10228	
Cairo Flavelle Holmes	41P/15	Falconbridge Ltd. "Flavelle-Holmes Group"	Au	Assess	STr	1987		
Cairo	41P/15	McGarry Minerals Inc.	Au	Assess	GL SA VLF-EM Mag Gc	1986 1986	2.9324 2.10017	
Carr	42A/09	Jemmett, F.	Au	Assess	STr	1987		
Carr	42A/09	Lac Minerals Ltd.	Au	Assess	DD (1) 666'	1987		
Carr	42A/09	Maude Lake Gold Mines Ltd. "Main Group"	SEE	UNDER	BEATTY TOWNSHIP			
Carr	42A/09	Maude Lake Gold Mines Ltd. "Wilkie-Carr Group"	Au	Assess D	DD (2) 700' CS	1986 1987		
Case	32E/04	Can. Nickel Co. Ltd. "Tri-Township Proj."	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Catharine	31M/13	Bishop, J.	Au	Assess D	STr DD (1) 350'	1987 1987		
Catharine Skead	31M/13	Golden Shield Res. Ltd. "Benson Lake Project"	Au	Assess	GL	1987	2.10287	
Catharine	31M/13 32D/04	Golden Shield Res. Ltd. "Larder Lake Area"	SEE	UNDER	BOSTON TOWNSHIP			
Catharine	31M/13	Hill, R.	Au	Assess	STr DD (1) 104'	1987		
Catharine Marter	31M/13	Penn-Lync Res. Ltd.	Au	Assess	Mag VLF-EM	1987	2.9827	
Catharine	31M/13	Perron, A.H. "Benson West Grid"	Au	Assess	STr	1987		
Catharine	31M/13	Perron, A.H. "Catharine Ten Grp."	Au	Assess	STr STr	1986 1987		
Catharine	31M/13	Perron, A.H. "Misema Eight Grid"	Au	Assess	STr	1987		
Catharine	31M/13 32D/04	Shenandoah Res. Ltd.	SEE	UNDER	BOSTON TOWNSHIP			
Catharine	31M/13	Teck Expl. Ltd. "Block II"	Au	Assess	GL	1986	2.9594	
Catharine	31M/13	Teck Expl. Ltd. "Block III"	Au	Assess	GL	1986	2.9594	
Catharine	31M/13	Teck Expl. Ltd. "Block IV"	Au	Assess	VLF-EM Mag	1987	2.9690	
Chesney Bay Galna	42A/16	Constat Petroleum Ltd.	Au	Assess	AEM AMag	1986	2.9687	
Chesney Bay	32D/13 32E/04 42A/16	Cream Silver Mines Ltd.	SEE	UNDER	BONIS TOWNSHIP			
Chesney Bay Galna, Purvis	42A/16	Gallant Gold Mines	Au	Assess	AMag AEM	1986	2.9478	
Chesney Bay	42A/16	National Mineral Corp.	SEE	UNDER	BOWYER TOWNSHIP			
Cleaver	42A/02	Asarco Expl. Co. of Canada Ltd. "Hawk Project"	Au	Assess	OVD (12) 1,483' OVDR	1987 1987	2.9968 2.10265	
Cleaver	42A/02	Cleyo Res. Inc.	Au	Assess	GL IP STr	1986 1987	2.9683	
Clifford	32D/05	Lac Minerals Ltd. "Grid C4"	Au	Assess	Mag	1986	2.9703	
Clifford	32D/05	Sullivan Mines Ltd.	Au	D	DD (6) 29'	1987		
Clifford	32D/05	Ventex Energy Ltd.	Au	Assess	Mag VLF-EM HLEM	1987	2.10174	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Clive	32E/04	Can. Nickel Co. Ltd. "Tri-Township Project"	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Cook	42A/08	Eldor Res. Ltd. "North Block" "South Block"	Au	Assess	Mag VLF-EM Gc	1986	2.9594	
Cook	42A/08	Marshall, C.	Au	Assess	STr, rTr AEM AMag	1987 1987	2.10343	
Cook	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Cook	42A/08	St. Joe Canada Inc. "Chevron-St. Joe Proj."	Au	Assess	AMag AEM	1986	2.9601	
Cook	42A/08	Wilzel Res. Ltd.	Au	Assess	Rad GL	1986	2.9570	
Coulson	42A/09	Campsall, L.	Au	Assess	rTr	1987		
Coulson	42A/09	Kennedy, W.	Au	Assess	STr	1987		
Coulson	42A/09	Maude Lake Gold Mines Ltd. "Coulson Group"	Au	Assess	GL	1986	2.9599	
Coulson	42A/09	Maude Lake Gold Mines Ltd. "Main Group"	SEE	UNDER	BEATTY TOWNSHIP			
Coulson	42A/08 42A/09	Maude Lake Gold Mines Ltd. "N.E. Group"	SEE	UNDER	BEATTY TOWNSHIP			
Coulson	42A/09	Wilzel Res. Ltd.	Au	Assess	Mag VLF-EM GL Rad	1987	2.10446	
Currie	42A/07	Chevron Minerals Ltd.	Au	Assess	OVD (18) 2,336'	1986	2.9774	
Currie	42A/10	Cominco Ltd. "Highway Grid"	Au	Assess	HLEM Mag	1987	2.9780	
Currie	42A/10	Cominco Ltd. "Main Grid"	Au	Assess	HLEM Mag	1987	2.9780	
Currie	42A/07	Rumleski, O.	Au	Assess	STr	1987		
Dokis	32D/05	Harvey, R.P.	Au	Assess	STr	1987		
Eby	42A/01	Hemlo Reef Res. Ltd.	Au	OMEP	Mag GL	1983	63.4402	
Eby	42A/01	Mary Ellen Res. Ltd. "Claim L 842563"	Au	Assess	Mag VLF-EM OVD (62) 2,532'	1987 1987	2.10210 2.10303	
Eby	42A/01	Mary Ellen Res. "Eby Group"	Au	Assess	STr	1985		
Eby	42A/01	Perron, A.H. "Dead Man Mine"	Au	Assess	Mag VLF-EM	1987	2.10394	
Eby	42A/01	Perron, A.H. "Eby Eight Group"	Au	Assess	Mag VLF-EM GL	1987	2.10395	
Eby	42A/01	Perron, A.H. "Eby 66 Group"	Au	Assess	VLF-EM	1987	2.9944	
Eby Grenfell	42A/01	Premier Expl. Inc.	Au	Assess	AEM AMag	1987	2.10385	
Eby Otto	42A/01	Reed, J.D.	Au	OMEP	STr	1983	63.4515	
Eby	42A/01	Rivard, F.	Au	Assess	DD (2) 604' STr	1986		
Elliott	32D/05	Perrex Res. Inc. "Ghost Lake South Area"	Au	Assess	AMag AEM	1986	2.9585	
Elliott Harker Thackeray	32D/05	Perrex Res. Inc. "Ghost River Area"	Au	OMEP OMEP	GL GL	1984 1985	63.4571 63.4571	
Elliott	32D/05	Perron, A.H. "Coastoro Res. Ltd. Option"	Au	Assess	GL	1987	2.10225	
Elliott	32D/05	Perron, A.H. "Elliott North Grp."	Au	Assess	STr DD (4) 1,367'	1986 1987		
Elliott	32D/05	Perron, J.E. "J.P. Five Group"	Au	Assess	GL	1987	2.10481	
Flavelle	41P/15	Falconbridge Ltd. "Flavelle-Holmes Grp."	SEE	UNDER	CAIRO TOWNSHIP			

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Frecheville	32D/12	Noranda Expl. Co. Ltd. "Frecheville West"	Au	Assess	DD (1) 726'	1987		
Galna	42A/16	Comstat Petroleum Ltd.	SEE	UNDER	CHESNEY BAY			
Galna	42A/16	Gallant Gold Mines	SEE	UNDER	CHESNEY BAY			
Galna	42A/16	National Mineral Corp.	SEE	UNDER	BOWYER TOWNSHIP			
Garrison	32D/12	Canamax Res. Inc. "C.J.M. Option"	Au	OMEP	DD (1) 482'	1984	63.4460	
Garrison	32D/12	Canamax Res. Inc. "Garrison Block"	Au	OMEP OMEP	DD (2) 1,073' Mag VLF-EM	1983 1983	63.4460 63.4460	
Garrison	32D/05	Cream Silver Mines Ltd.	Au	Assess	DD (4) 1,379' DD (6) 3,686'	1986 1987		
Garrison Harker	32D/05	Grandad Res. Ltd. "Ghost River Prop."	Au	Assess	DD (2) 306' DD (7) 1,314'	1986 1987		
Garrison	32D/05	Hobbs, L.G. "Garrison 4 Prop."	Au	Assess	VLF-EM Mag	1987	2.10404	
Garrison	32D/05 32D/12	Jonpol Expl. Ltd. "Garcon Property"	Au	D	GR	1986		
Garrison Thackeray	32D/05	Kerr Addison Mines Ltd. "Kerr Garrison Property"	Au	Assess	DD (6) 2,767'	1987		
Garrison Harker	32D/05	Lynx Canada Expl. Ltd.	Au	Assess	DD (4) 3,064' GL IP	1986 1987	 2.9713	
Garrison Michaud	32D/05 42A/08	Moses, J.R.	Au	OMEP	DD (1) 486'	1984		
Garrison Michaud	42A/08	Nahanni Mines Ltd. "Oct. & Sept. Grid"	Au	Assess	DD (6) 2,785' SA	1986 1987	 2.10188	
Garrison	32D/05	Noranda Expl. Co. Ltd. "Garrison Property"	Au	Assess	DD (4) 3,144'	1987		
Garrison	32D/05	Perron, A.H. "Perrex Claims"	Au	Assess	GL DD (1) 971'	1985 1987	2.9551	
Gauthier	32D/04	Cons. Thompson-Lundmark Gold Mines Ltd. "Gauthier East Group"	Au	Assess	OVD (38) 1,794'	1985	2.9700	
Gauthier	32D/04	Hoffman Expl. & Minerals Ltd. "Gauthier East Grp."	Au	OMEP	SA	1984	63.4450	
Gauthier Lebel	32D/04	Hoffman Expl. & Minerals Ltd. "Gauthier F Grp."	Au	OMEP	SA	1984	63.4450	
Gauthier	32D/04	Lac Minerals Ltd. "Gauthier Project"	Au	Assess	DD (3) 1,978'	1986		
Gauthier	32D/04	MacGregor, R.A. "Beaverhouse Road Group"	Au	Assess	VLF-EM	1987	2.10079	
Gauthier	32D/04	MacGregor, R.A. "Mousseau Lake Group"	Au	Assess	VLF-EM Mag	1987	2.10466	
Gauthier	32D/04	Perron, A.H. "Northland Grid"	Au	Assess	STr DD (1) 553'	1986 1987		
Gauthier	32D/04	657873 Ontario Ltd.	Au	Assess	STr SA GL GL	1986 1986	2.9473 2.9617	
Grenfell	42A/01	Glen Auden Res. Ltd.	SEE	UNDER	BOMPAS TOWNSHIP			
Grenfell	42A/01	Neighbors Res. Ltd.	Au	Assess	DD (9) 2,292'	1987		
Grenfell	42A/01	Perron, A.H. "Stitt Claims"	Au	Assess	STr	1987		
Grenfell	42A/01	Premier Expl. Inc.	SEE	UNDER	FRY TOWNSHIP			
Grenfell	42A/01	Vallier, R.W.	Au	Assess	DD (1) 183'	1987		
Grenfell	42A/01	Wilson, R.C.	Au	Assess	Mag VLF-EM GL	1987	2.10312	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Guibord	42A/08	Hogan, J.	Au	Assess	GL	1987	2.10384	
Guibord	32D/05	Jascan Res. Ltd.	Au	OMEP	DDR	1985	63.4631	
Guibord Munro	42A/08 42A/09	Lacana Mining Corp.	Au	Assess	DD (1) 480' Mag VLF-EM	1986 1987	 2.10068	
Guibord	42A/08	Neal, H.E. "Guibord Property"	Au	Assess	VLF-EM	1986	2.9896	
Guibord	32D/12	Noranda Expl. Co. Ltd. "Guibord 1-84"	Au	Assess	Gc	1987	2.10219	
Guibord	42A/08	Obradovich, T.	Au	Assess	AEM AMag	1986	2.9616	
Guibord	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Harker	32D/05	American Barrick Res. Corp. "Newmex Option"	Au	Assess	DD (1) 886'	1987		
Harker	32D/05	American Barrick Res. Corp. "West Block"	Au	Assess	DD (1) 686' DD (2) 1,769'	1986 1987		
Harker	32D/05	Argentex Res. Expl. Corp.	Au	Assess	STr	1986		
Harker	32D/05	Golden Harker Expl. Ltd. "Discovery-Lenora Joint Venture" "North Group"	Au	OMEP	DD (6) 3,856'	1985		
Harker	32D/05	Golden Harker Expl. Ltd. "Nelson-Harley Group"	Au	Assess	DD (4) 1,714'	1985		
Harker	32D/05	Grandad Res. Ltd. "Ghost River Prop."	SEE	UNDER	GARRISON TOWNSHIP			
Harker	32D/05	Lynx Canada Expl. Ltd.	SEE	UNDER	GARRISON TOWNSHIP			
Harker	32D/05	Perrex Res. Inc. "Airborne Group"	Au	Assess	DD (1) 522' DD (22) 22,876'	1986 1987		
Harker	32D/05	Perrex Res. Inc. "Duncan Claim Grp."	Au	Assess	STr	1985		
Harker	32D/05	Perrex Res. Inc. "Ghost River Area"	SEE	UNDER	ELLIOTT TOWNSHIP			
Harker	32D/05	Perrex Res. Inc. "Harker Lake Grid"	Au	OMEP OMEP OMEP	GL PR GL	1984 1984 1985		
Hearst	32D/04	Falconbridge Ltd. "Project PH 660" "PH 613"	Au	Assess OMEP OMEP	DD (3) 1,584' DD (5) 4,073' VLF-EM Mag GL IP Gc	1986 1985 1985 1985	 63.4636 63.4636	
Hearst Skead	31M/13	MacGregor, R.A. "Benson Creek North"	Au	Assess	OVD (26) 1,515' DD (1) 497'	1986 1987	2.9534	
Hearst	32D/04	MacGregor, R.A. "Carbonate Group"	Au	Assess	Mag VLF-EM	1987	2.10202	
Hearst	32D/04	MacGregor, R.A. "Larder Lakeside Prop."	Au	Assess	DD (1) 491' Mag	1984 1986	 2.9919	
Hearst	32D/04	MacGregor, R.A. "Larder Townsite Property"	Au	Assess	DD (1) 377'	1987		
Hearst	32D/04	MacGregor, R.A. "Martin-Bird South"	Au	Assess	DD (5) 5,354'	1987		
Hearst	32D/04	MacGregor, R.A. "Southwest Arm"	Au	Assess	VLF-EM	1987	2.9971	
Hearst	32D/04	Prevec, L.	Au	Assess	SP	1987	2.10247	
Hearst	32D/04	Rivard, P.	Au	Assess	DD (1) 272'	1987		
Hearst	32D/04	Sudbury Contact Mines Ltd. "Sharp Creek Claim Group"	Au	Assess	HLEM Mag	1987	2.10051	
Hearst McElroy Skead	31M/13 32D/04	Sudbury Contact Mines Ltd. "Skead-Hearst-McElroy Proj."	Au	Assess	Mag HLEM	1987	2.10115	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hepburn	32E/04	Can. Nickel Co. Ltd. "Tri-Township Proj."	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Hepburn Sargeant	32D/13	Dallaire, J.; Grondin, Y.; Salo, L.; St. Louis, M.	Au	Assess	AEM AMag	1986	2.9589	
Hepburn	32D/13	Del Norte Chrome Corp.	SEE	UNDER	BONIS TOWNSHIP			
Hepburn Sargeant	32D/13	Silver Septre Res. Ltd.	Au	Assess	AEM AMag	1987	2.9688	
Hincks	42A/01	Manville Canada Inc. "McGill Group 2"	Au	Assess	rTr STr	1986 1987		
Hislop	42A/08 42A/09	Armco Mineral Expl. Ltd. "Parsons Hislop Property"	Au	OMEP	DD (27) 6,911'	1984	63.4348	
Hislop	42A/08	Canamax Res. Inc. "Hislop 1"	Au	Assess	DD (1) 620'	1987		
Hislop	42A/08	Matachewan Cons. Mines Ltd.	Au	OMEP	DD (3) 1,208'	1984	63.4430	
Hislop	42A/08	Neal, M.E.	Au	Assess	VLF-EM	1986	2.9566	
Hoblitzell Noseworthy	32D/05	Cogema Can. Ltd.	Au	Assess	STr GL STr	1986 1986 1987	2.9701	
Hoblitzell	32D/05	Esso Minerals Can. (Esso Res. Can. Ltd.) "HN Prospect"	SEE	UNDER	BLAKELOCK TOWNSHIP			
Hoblitzell	32E/05	Newmont Expl. of Canada Ltd. "Golden Shield Property"	Au	Assess	DD (8) 5,987'	1987		
Hoblitzell	32E/05 32E/12	Noranada Expl. Co. Ltd. "Kabika Prop."	SEE	UNDER	BRADETTE TOWNSHIP			
Holloway	32D/12	Argentex Res. Expl. Corp. Ltd. "Inco Option"	Au	OMEP OMEP	DD (3) 1,464' GL	1984 1984	63.4545 63.4545	
Holloway	32D/05	Canadian Nickel Co. Ltd.	Au	OMEP	Mag HLEM GL	1985	63.4560	
Holloway	32D/12	Canamax Res. Inc. "Holloway 2"	Au	OMEP	DD (23) 14,571'	1984	63.4460	
Holloway	32D/12	Canamax Res. Inc. "Manville Option"	Au	OMEP	DD (10) 5,983'	1984	63.4460	
Holloway	32D/12	Canamax Res. Inc. "Mining Corp. Prop."	Au	OMEP	DD (2) 1,132'	1984	63.4460	
Holloway Marriott	32D/05	Edda Resources Ltd.	Au	Assess	AEM AMag	1986	2.9908	
Holloway Tannahill	32D/05	Newmont Expl. of Canada Ltd. "Holloway Project"	Au	Assess	GL Gc	1986	2.9543	
Holmes	42A/01	Chevron Minerals Ltd.	SEE	UNDER	BURT TOWNSHIP			
Holmes	41P/15	Falconbridge Ltd. "Flavelle-Holmes Grp."	SEE	UNDER	CAIRO TOWNSHIP			
Holmes	42A/02	Falconbridge Ltd. "South Grid"	Au	Assesss	Gc	1987	2.10369	
Hurtubise	32D/05	Conscott Res. Ltd./ Glen Auden Res. Ltd.	Au	Assess	AEM AMag	1986	2.9789	
Hurtubise	32D/05	Glen Auden Res. Ltd.	Au	Assess	AEM AMag	1986	2.9788	
Hurtubise Singer	32D/05	New Kelore Mines Ltd./Glen Auden Res. Ltd.	Au	Assess	AEM AMag	1986	2.9786	
Hurtubise Noseworthy St. Laurent Tomlinson	32E/05	Noranda Expl. Co. Ltd. "Burntbush River Area"	Au	Assess	AMag AEM DD (1) 986'	1987 1987	2.9859	
Hurtubise	32E/05	Noranda Expl. Co. Ltd. "Gervais Opt."	SEE	UNDER	BRADETTE TOWNSHIP			

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hurtubise	32D/05	Noranda Expl. Co. Ltd. "Glen Auden Project"	Au	Assess	Mag HLEM	1987	2.9824	
Hurtubise	32E/05 32E/12	Noranda Expl. Co. Ltd. "Kabika Prop."	SEE	UNDER	BRADETTE TOWNSHIP			
Hurtubise Noseworthy	32E/06	Santa Maria Res. Ltd.	Au	Assess	AMag AEM	1987	2.9906	
Hurtubise St. Laurent	32E/05	Glen Auden Res. Ltd. "Shango Prop."	Au	Assess	AMag AEM	1986	2.9799	
Katrine	32D/04	Coventry Ventures Inc.	SEE	UNDER	ARNOLD TOWNSHIP			
Katrine	32D/04	Kiasyk, R.	Au	Assess	DD (4) 460' SA DD (2) 212'	1986 1986 1987	2.9715	
Kenning	32E/04	Can. Nickel Co. Ltd. "Tri-Township Proj."	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Kenning Tomlinson	32D/04 32D/05 42H/01 42H/08	Cunningham, L.J.; Forbes, J.; Glen Auden Res. Ltd.; Kerr Addison Mines Ltd.	Au	Assess	AMag AEM	1987	2.9962	
Kerrs Rayner Lake	42A/09	Noranda Expl. Co. Ltd. "Vital Pacific Property"	Au	Assess	DD (4) 3,904'	1986		
Lamplugh Rand	32D/12	Kidd Creek Mines Ltd.	Au	Assess	Mag VLF-EM	1987	2.9950	
Lamplugh Rand	32D/12	St. Joe Canada Inc.	Au	Assess	Mag	1987	2.9871	
Lamplugh	32D/12	Seal River Expl. Ltd.	Au	Assess	GL Gc DD (6) 5,244'	1986 1987	2.9586	
Lebel	32D/04	Canadian Gold Res. Inc.	Au	D	UG	1987		
Lebel	32D/04	Cunningham, L.J. "Rouzan Prop."	Au	Assess	DD (4) 3,296'	1987		
Lebel	32D/04	ENR (1980) Partnership Ltd. "Moffat-Hall Prop."	Au	OMEP OMEP	IP DD (3) 1,911'	1984 1985	63.4463 63.4463	
Lebel	32D/04	Hoffman Expl. & Minerals Ltd. "Gauthier F Grp."	SEE	UNDER	GAUTHIER TOWNSHIP			
Lebel	32D/04	Homestake Expl. Ltd.	Au	Assess	STr	1986		
Lebel	32D/04	Lampe Res. Co. Ltd.	Au	Assess	STr	1987		
Lebel	32D/04	Lawrence, R.W.	Au	Assess Assess	GL SA SA	1986 1987	2.10316 2.10316	
Lebel	32D/04	Lawrence, R.W. "King Kirkland Prop."	Au	Assess	STr	1987		
Lebel	32D/04	Leahy, M. "East Black Prop."	Au	Assess	Mag	1987	2.10204	
Lebel	32D/04	Leahy, M. "Heart Lake Group"	Au	Assess	GL Gc	1986	2.9663	
Lebel	32D/04	Leahy, M.;Black, A. "Crystal Lake Prop."	Au	Assess	Mag	1987	2.10083	
Lebel	32D/04	O'Connor, F.T.	Au	D	UG	1923		
Lebel	32D/04	Premier Expl. Inc. "King Kirkland Prop."	Au	Assess	STr	1987		
Lebel	32D/04	Premier Expl. Inc. "Sylvanite Tailings"	Au	Assess	Mag VLF-EM	1987	2.10004	
Lebel	32D/04	Tamminen, T.	Au	Assess	rTr	1986		
Lee	42A/01	Glen Auden Res. Ltd.	SEE	UNDER	BOMPAS TOWNSHIP			
Lee Maisonville	42A/01	Robazza, L. & R.	Au	Assess	Mag	1986	2.9553	
Maisonville	42A/01	Glen Auden Res. Ltd.	SEE	UNDER	BOMPAS TOWNSHIP			

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Maisonville	42A/01	Glen Auden Res. Ltd. "Grenfell Property"	Au	Assess	DD (13) 4,527' IP	1986 1986	 2.9901	
Maisonville	42A/01	New Jay Res. Ltd. "Pryme-Maisonville Property"	Au	Assess	DD (4) 3,567'	1985		
Maisonville	42A/01	Noranda Expl. Co. Ltd. "Maisonville 1-82"	Au	Assess	DD (2) 1,046'	1986		
Maisonville	42A/01	Robazza, L. & R.	SEE	UNDER	LEE TOWNSHIP			
Marriott	32D/05 32D/12	Beckett, R.T.	Au	Assess	GL	1987	2.9724	
Marriott	32D/12	Canamax Res. Inc. "Marriott 2"	Au	OMEP	DD (2) 888'	1985	63.4460	
Marriott	32D/05	Cright, K.; Louie, D.	Au	Assess	AEM AMag	1987	2.9873	
Marriott	32D/12	Dalhousie Oil Co. Ltd.	Au	Assess	DD (3) 1,577'	1986		
Marriott	32D/05	Edda Resources Ltd.	SEE	UNDER	HOLLOWAY TOWNSHIP			
Marriott	32D/05	Hennessey, A.W. "Area A-1"	Au	Assess	AEM AMag	1986	2.9554	
Marriott	32D/05	Hennessey, A.W. "Area A-2"	Au	Assess	AEM AMag	1986	2.9554	
Marriott	32D/05 32D/12	Neal, M.E. "Marriott Claims"	Au	Assess	GL	1987	2.9977	
Marter	31M/13	Penn-Lync Res. Ltd.	SEE	UNDER	CATHARINE TOWNSHIP			
McCann	42A/09	Hyde, D.	Au	Assess	rTr	1986		
McCool Munro	42A/08	Ateba Mines Inc.	Au	Assess	Mag VLF-EM	1987	2.10054	
McCool	42A/09	Placer Development Ltd. "Belore Option"	Au	OMEP OMEP OMEP	OVD (41) 4,804' Mag VLF-EM GL DD (20) 16,646'	1984 1984 1985	63.4372 63.4372 63.4633	
McElroy	31M/13 32D/04	Golden Shield Res. Ltd. "Larder Lake Area"	SEE	UNDER	BOSTON TOWNSHIP			
McElroy	32D/04	MacGregor, R.A. "Southeast Grid"	Au	Assess	OVD (23) 1,338' DD (2) 1,934' SA	1986 1987 1987	2.9534 2.10483	
McElroy	32D/04	Shenandoah Mines Ltd.	Au	Assess	SA SA	1987 1987	2.10374 2.10373	
McElroy	31M/13 32D/04	Shenandoah Res. Inc.	SEE	UNDER	BOSTON TOWNSHIP			
McElroy	31M/13 32D/04	Sudbury Contact Mines Ltd. "Skead-Hearst-McElroy Proj."	SEE	UNDER	HEARST TOWNSHIP			
McElroy	32D/04	Taman Res. Ltd.	Au	OMEP	GL	1984	63.4521	
McFadden McGarry	32D/04	MacGregor, R.A. "McFadden-McGarry Property"	Au	Assess	Mag VLF-EM VLF-EM	1987 1987	2.9911 2.10080	
McGarry	32D/04	Boudreault, R; Spadetto, G.	Au	B Assess	[illegible] VLF-EM	1987 1986	 2.10008	
McGarry	32D/04	Lee Geo Indicators Ltd.	Au	OMEP OMEP OMEP OMEP	GL Mag Gc STr DD (61) 30,390' Mag GL IP DD (8) 4,620'	1985 1985 1984 1984	63.4512 63.4512 63.4352 63.4352	
McGarry	32D/04	MacGregor, R.A. "Claim 579785"	Au	OMEP	SA	1983	2.5652	
McGarry	32D/04	MacGregor, R.A. "McFadden-McGarry Property"	SEE	UNDER	McFADDEN TOWNSHIP			
McGarry	32D/04	McGarry Res. Inc.	Au	OMEP OMEP OMEP	IP HEM VLF-EM Mag Gc GL DD (51) 20,240'	1985 1985 1986	63.4638 63.4638 63.4638	
McGarry	32D/04	Queenston Gold Mines Ltd. "Kosy Project"	Au	Assess	GL	1986	2.10001	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McNeil	42A/02	Kasran Res. Ltd.	SEE	UNDER	ARGYLE TOWNSHIP			
McNeil	42A/02	Konovsky, P.R.	Au	Assess	DD (1) 399'	1985		
McVittie	32D/04	Lac Minerals Ltd. "McVittie Prop."	Au	Assess	DD (4) 2,268'	1985		
					SA	1986	2.10440	
					OVD (281) 7,621'	1987	2.10440	
McVittie	32D/04	Lenora Expl. Ltd.	Au	OMEP	DD (1) 1,737'	1986		
McVittie	32D/04	MacGregor, R.A. "Claim S65060"	Au	OMEP	SA	1983	2.4484	
McVittie	32D/04	MacGregor, R.A. "Fork Lake Group"	Au	Assess	VLF-EM	1987	2.10050	
McVittie	32D/04	MacGregor, R.A. "Skead Holdings Group"	Au	Assess	VLF-EM	1987	2.10049	
					Mag VLF-EM	1987	2.10049	
McVittie	32D/04	MacGregor, R.A. "Station Townsite"	Au	Assess	VLF-EM Mag	1987	2.10424	
Melba	42A/08	Boone, P.; Laurila, J.P.	Au	Assess	rTr STr	1987		
Melba	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Melba	42A/01 42A/08	Westfield Minerals Ltd. "Fitter Lake Property"	SEE	UNDER	BARNET TOWNSHIP			
Michaud	42A/08	Hennessey, A.W.	Au	Assess	AEM AMag	1986	2.9544	
Michaud	42A/08	Kidd Creek Mines Ltd. "Garrison Creek Property"	Au	Assess	DD (1) 499'	1987		
Michaud	32D/05 42A/08	Moses, J.R.	SEE	UNDER	GARRISON TOWNSHIP			
Michaud	42A/08	Nahanni Mines Ltd. "Oct. & Sept. Grid"	SEE	UNDER	GARRISON TOWNSHIP			
Michaud	42A/08	Noranda Expl. Co. Ltd. "Barnet A Grid"	SEE	UNDER	BARNET TOWNSHIP			
Michaud	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Midlothian	41P/15	Goldteck Mines Ltd.	Au	Assess	DD (3) 1,006'	1987		
Milligan Rayner Lake	42A/09	B.P. Resources Ltd.	Au	Assess	Mag	1986	2.9542	
Milligan Rayner Lake	42A/09	St. Genevieve Res. Ltd.	Au	Assess	Mag VLF-EM	1987	2.10002	
Milligan Rayner Lake	42A/09	Utex Gold "Grubstake 84"	Au	Assess	SA	1984	2.8124	
Moody	42A/16	McKinnon, D. "Mortson-Salo Claims"	Au	Assess	AMag AEM	1986	2.9475	
Moody	42A/16	Utah Mines Ltd. "Jim's Lake Prop."	Au	Assess	DD (1) 493'	1985		
Moody Wesley	42A/16	Utah Mines Ltd. "Abitibi Destroyes"	Au	Assess	T-EM AMag	1987	2.9875	
					T-EM	1987	2.9874	
Morrisette	32D/04	Edda Resources Inc.	Au	OMEP	IP	1985	63.4508	
Morrisette	32D/04	Gamble, S.G.	Au	Assess	SA	1987	2.10070	
Morrisette	32D/04	Kinbauri Gold Corp. "Lahaie Claim Grp."	Au	Assess	DD (2) 660'	1986		
				D	CS	1987		
				Assess	SA OVD (2) 590'	1986	2.10076	
Morrisette	32D/04	Kinbauri Gold Corp. "Morrisette Claim Group"	Au	Assess	SA	1986	2.9530	
					DD (5) 1,259' CS	1987		
					SA	1987	2.10186	
Morrisette	32D/04	Monopros Ltd.	SEE	UNDER	ARNOLD TOWNSHIP			
Mortimer	42A/15	St. Denis, R.	Au	Assess	rTr STr SA	1987	2.10150	
Munro	42A/08	Ateba Mines Inc.	SEE	UNDER	MCCOOL TOWNSHIP			
Munro	42A/09	Bruneau Mining Corp.	Au	Assess	DD (1) 804'	1986		
Munro	42A/09	Canamax Res. Inc. "Meunier Option"	Au	Assess	DD (3) 1,919'	1987		

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Munro	42A/08 42A/09	Lacana Mining Corp.	SEE	UNDER	GUIBORD TOWNSHIP			
Munro	42A/09	Lalonde, D.	Au	Assess	rTr STr Mag VLF-EM SA	1987 1987 1987	 2.10069 2.10075	
Munro	42A/09	Mangan, J.J.	Au	Assess	Mag VLF-EM	1986	2.9557	
Munro	42A/09	Manville Canada Ltd. "Adit Zone"	Au	Assess	Rad VLF-EM GL Mag	1987	2.9793	
Munro	42A/09	McChristie, C.	Au	Assess	STr	1987		
Munro	42A/09	Perron, A.H. "Perron & Pollock Project"	Au	Assess	STr GL	1987 1987	 2.10434	
Munro	42A/09	Rumleski, O.	Au	Assess	STr	1987		
Newman	32D/04	Billikin Res. Ltd.	Au	Assess	Mag HLEM	1987	2.10137	
Newman	42H/08	Casau Expl. Ltd.	SEE	UNDER	BRAGG TOWNSHIP			
Newman Tomlinson	42H/08	Chesbar Res. Inc. "Mikwam River Proj."	Au	Assess	HLEM Mag DD (12) 6,658'	1987 1987	2.9878	
Newman	42H/08	Garry Gold Inc.	Au	Assess	Mag	1987	2.10140	
Newman	42H/08	Glen Auden Res. Ltd.	Au	Assess	AEM AMag	1987	2.9864	
Newman Tomlinson	42H/08	Grandad Res. Inc.	Au	Assess	OVD (72) 7,420'	1987	2.10047	
Newman	32E/08	Ingamar Expl. Ltd./ Glen Auden Res. Ltd. "Joint Venture"	SEE	UNDER	BLAKELOCK TOWNSHIP			
Newman	42H/08	Montclerg Res. Ltd./ Glen Auden Res. Ltd. "Floodwood Lake Prop."	SEE	UNDER	BLAKELOCK TOWNSHIP			
Newman Tomlinson	42H/08	Pan East Res. Inc.	Au	Assess	AMag AEM	1987	2.9894	
Newman	42H/08	Shoal Petroleum Ltd.	SEE	UNDER	BRAGG TOWNSHIP			
Northeast Bay	32D/13 32E/04 42A/16	Cream Silver Mines Ltd.	SEE	UNDER	BONIS TOWNSHIP			
Northeast Bay	32D/13	Del Norte Chrome Corp.	SEE	UNDER	BONIS TOWNSHIP			
Northeast Bay	32D/13	Utah Mines Ltd. "Lake Abitibi Gold Property"	SEE	UNDER	BONIS TOWNSHIP			
Noseworthy	32D/05	Cogema Can. Ltd.	SEE	UNDER	HOBLITZELL TOWNSHIP			
Noseworthy	32D/05	Esso Minerals Can. (Esso Res. Can. Ltd.) "HN Prospect"	SEE	UNDER	BLAKELOCK TOWNSHIP			
Noseworthy	32E/05 32E/12	Glencannon Res. Inc.	Au	Assess	DD (3) 3,006'	1987		
Noseworthy	32E/05 32E/12	Newmont Expl. of Canada Ltd.	SEE	UNDER	BRADETTE TOWNSHIP			
Noseworthy	32E/05	Noranda Expl. Co. Ltd. "Burntbush River Area"	SEE	UNDER	HURTUBISE TOWNSHIP			
Noseworthy	32E/05	Noranda Expl. Co. Ltd. "Gervais Opt."	SEE	UNDER	BRADETTE TOWNSHIP			
Noseworthy	32E/05 32E/12	Noranda Expl. Co. Ltd. "Kabika Prop."	SEE	UNDER	BRADETTE TOWNSHIP			
Noseworthy	32E/05	Orebay Resources	Au	Assess	VLF-EM	1986	2.10043	
Noseworthy	32E/06	Santa Maria Res. Ltd.	SEE	UNDER	HURTUBISE TOWNSHIP			
Otto	42A/01	Birnie, B.	Au	Assess	STr rTr STr	1986 1987		
Otto	42A/01	Homestake Expl. Ltd. "Vigrass Lake Prop."	Au	Assess	STr rTr SA GL	1986 1986	 2.9639	
Otto Teck	42A/01	H.S.K. Minerals Ltd.	Au	Assess	HLEM Mag	1987	2.10097	

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Otto	42A/01	Reed, J.D.	SEE	UNDER	EBY TOWNSHIP			
Otto	42A/01	Zabudsky, D.	Au	Assess	DD (1) 356'	1986		
Pacaud	31M/13	Boston Creek Mines Ltd.	Au	Assess Assess	rTr rTr STr	1986 1987		
Pacaud	31M/13 32D/04	Golden Shield Res. Ltd. "Larder Lake Area"	SEE	UNDER	BOSTON TOWNSHIP			
Pacaud	31M/13	Hurd, D.F.	Au	Assess	STr	1986		
Pacaud	31M/13 32D/04	Perron, A.H. "Barry Hollinger Property"	SEE	UNDER	BOSTON TOWNSHIP			
Playfair	42A/08	Marjel Res. Inc.	Au	OMEP Assess	GR GL	1984 1987	 2.10332	
Playfair	42A/08	Newjay Res. Ltd.	SEE	UNDER	BLACK TOWNSHIP			
Purvis	32D/13 32E/04 42A/16	Cream Silver Mines Ltd.	SEE	UNDER	BONIS TOWNSHIP			
Purvis	42A/16	Gallant Gold Mines	SEE	UNDER	CHESNEY BAY			
Rand	32D/12	Kidd Creek Mines Ltd.	SEE	UNDER	LAMPLUGH TOWNSHIP			
Rand	32D/12	Rocky Mines Ltd.	Au	Assess	DD (2) 635'	1986		
Rand	32D/12	St. Joe Canada Inc.	SEE	UNDER	LAMPLUGH TOWNSHIP			
Rayner Lake	42A/09	B.P. Resources Ltd.	SEE	UNDER	MILLIGAN TOWNSHIP			
Rayner Lake	42A/16	New Era Minerals Inc.	Au	Assess	STr DD (3) 1,154'	1987		
Rayner Lake	42A/09	Noranda Expl. Co. Ltd. "Vital Pacific Property"	SEE	UNDER	KERRS TOWNSHIP			
Rayner Lake	42A/09	St. Genevieve Res. Ltd.	SEE	UNDER	MILLIGAN TOWNSHIP			
Rayner Lake	42A/09	Utex Gold "Grubstake 84"	SEE	UNDER	MILLIGAN TOWNSHIP			
Robertson	42A/02	Kasran Res. Ltd.	SEE	UNDER	ARGYLE TOWNSHIP			
St. Laurent	32E/05	Abagold Res. Inc./ Glen Auden Res. Ltd. "Joint Venture"	Au	Assess	AEM AMag	1987	2.9744	
St. Laurent	32E/05	Goldrock Res. Inc. "Glen Auden Opt."	SEE	UNDER	BRADETTE TOWNSHIP			
St. Laurent	32E/05	Noranda Expl. Co. Ltd. "Burntbush River Area"	SEE	UNDER	HURTUBISE TOWNSHIP			
St. Laurent	32E/05	Noranda Expl. Co. Ltd. "Gervais Opt."	SEE	UNDER	BRADETTE TOWNSHIP			
St. Laurent	32E/05 32E/12	Noranda Expl. Co. Ltd. "Kahika Prop."	SEE	UNDER	BRADETTE TOWNSHIP			
St. Laurent	32E/05	Orsina Res. Ltd.	Au	Assess	IP Mag DD (3) 1,502' CS SA	1987 1987 1987 1987	2.9856 2.9783 2.10207	
St. Laurent	32E/05	Glen Auden Res. Ltd. "Shango Prop."	SEE	UNDER	HURTUBISE TOWNSHIP			
Sargeant	32D/13	Dallaire, J.; Grondin, Y.; Salo, L.; St. Louis, H.	SEE	UNDER	HEPBURN TOWNSHIP			
Sargeant	32D/13	Del Norte Chrome Corp.	SEE	UNDER	BONIS TOWNSHIP			
Sargeant	32D/13	Silver Septre Res. Ltd.	SEE	UNDER	HEPBURN TOWNSHIP			
Scapa	32D/13 32E/04 42A/16	Cream Silver Mines Ltd.	SEE	UNDER	BONIS TOWNSHIP			
Scapa	32D/13	Del Norte Chrome Corp.	SEE	UNDER	BONIS TOWNSHIP			

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Singer	32E/04	Can. Nickel Co. Ltd. "Tri-Township Proj."	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Singer	32D/05	New Kelore Mines Ltd./Glen Auden Res. Ltd.	SEE	UNDER	HURTUBISE TOWNSHIP			
Skead	31M/13	Golden Shield Res. Ltd. "Benson Lake Project"	SEE	UNDER	CATHARINE TOWNSHIP			
Skead	31M/13 32D/04	Golden Shield Res. Ltd. "Larder Lake Area"	SEE	UNDER	BOSTON TOWNSHIP			
Skead	31M/13	Lac Minerals Ltd. "Grid SK 1"	Au	Assess	Mag	1987	2.9840	
Skead	31M/13	MacGregor, R.A. "Benson Creek North"	SEE	UNDER	HEARST TOWNSHIP			
Skead	32D/13	Maple Mountain Res. "LaFond Project"	Au	OMEP	SA Mag VLF-EM GL	1985	63.4419	
Skead	31M/13 32D/04	Sudbury Contact Mines Ltd. "Skead-Hearst-McElroy Proj."	SEE	UNDER	HEARST TOWNSHIP			
Steele	32D/13 32E/04 42A/16	Cream Silver Mines Ltd.	SEE	UNDER	BONIS TOWNSHIP			
Steele	32D/13	Utah Mines Ltd. "Lake Abitibi Gold Property"	SEE	UNDER	BONIS TOWNSHIP			
Stoughton	32D/12	Noranda Expl. Co. Ltd. "Stoughton 1-79"	Au	Assess	DD (9) 7,204'	1987		
Stoughton	32D/12	Pamour Porcupine Mines Ltd.	Au	Assess	GL	1987		
Sulphur Island	32E/13	McKinnor, D. (et al.) "Shaft Island Area"	Au	Assess	DD (7) 2,993'	1987		
Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 4"	Au	Assess	Mag	1986	2.9922	
Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 10"	Au	Assess	Mag	1987	2.9921	
Tannahill	32D/05	Miron, T.	Au	Assess	STr	1986		
Tannahill	32D/05	Newmont Expl. of Canada Ltd. "Holloway Project"	SEE	UNDER	HOLLOWAY TOWNSHIP			
Taylor	42A/10	Goldex Res. Inc.	Au	OMEP	Mag DD (6) 3,969'	1984	63.4502	
Taylor	42A/10	Quebec Sturgeon River Mines	Au	OMEP	DD (6) 4,352'	1983		
Teck	42A/01	Eden Roc Mineral Corp.	Au	OMEP	DD (2) 243'	1984		
Teck	42A/01	Free Gold Recovery Inc.	Au	Assess	OVD (14) 241'	1986	2.9714	
Teck	42A/07	Goldhunter Expl. Inc.	Au	Assess	DD (8) 6,395'	1987		
Teck	42A/01	H.S.K. Minerals Ltd.	SEE	UNDER	OTTO TOWNSHIP			
Teck	42A/01	Lac Minerals Ltd. "Claim L 842970"	Au	Assess	DD (1) 2,076'	1987		
Teck	42A/01	Nova Beaucage Mines Ltd.	Au	Assess	STr	1987		
Teck	42A/01	Perron, A.H. "Ami Creek Group"	Au	Assess	STr	1986		
Teck	42A/01	Perron, A.H. "Groups 1 & 2"	Au	Assess	Mag	1987	2.9945	
Teck	42A/01	Perron, A.H. "Lois Lake Group"	Au	Assess	DD (2) 599'	1987		
Teck	42A/01	Perron, A.H. "Wedge Claims"	Au	Assess	DD (1) 472'	1986		

TABLE 11.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Teck	42A/01	Premier Expl. Inc. "Wright-Hargreaves Tailings Basin"	Au	Assess	Mag VLF-EM	1987	2.10003	
Teck	42A/01	Stewart, A.	Au	Assess	STr	1986		
Thackeray	32D/05	Cominco Ltd. "Airborne Grp."	Au	Assess	DD (10) 5,367'	1986		
Thackeray	32D/05	Cominco Ltd. "Grid 1"	Au	Assess	Mag HLEM IP DD (7) 3,348'	1986 1987	2.9625	
Thackeray	32D/05	Cominco Ltd. "Grid 2"	Au	Assess	Mag HLEM DD (2) 1,305'	1986 1987	2.9624	
Thackeray	32D/05	Cominco Ltd. "Grid 3"	Au	Assess	HLEM Mag	1986	2.9625	
Thackeray	32D/05	Kerr Addison Mines Ltd. "Kerr Garrison Property"	SEE	UNDER	GARRISON TOWNSHIP			
Thackeray	32D/05	Perrex Res. Inc. "Ghost River Area"	SEE	UNDER	ELLIOTT TOWNSHIP			
Thackeray	32D/05	Perrex Res. Inc. "Thackeray Tp. Group"	Au	Assess	AEM AMag	1986	2.9584	
Thackeray	42A/08	Peter Island Res. Inc.	SEE	UNDER	BARNET TOWNSHIP			
Tomlinson	42H/08	Chesbar Res. Inc. "Mikwam River Proj."	SEE	UNDER	NEWMAN TOWNSHIP			
Tomlinson	32D/04 32D/05 42H/01 42H/08	Cunningham, L.J.; Forbes, J.; Glen Auden Res. Ltd.; Kerr Addison Mines Ltd.	SEE	UNDER	KENNING TOWNSHIP			
Tomlinson	32E/08	Findore Minerals Inc.	Au	Assess	AEM-VLF AMag	1987	2.10423	
Tomlinson	32E/05	Glen Auden Res. Ltd.	Au	Assess	HLEM Mag	1986	2.9847	
Tomlinson	42H/08	Grandad Res. Inc.	SEE	UNDER	NEWMAN TOWNSHIP			
Tomlinson	32E/05	Noranda Expl. Co. Ltd. "Burntbush River Area"	SEE	UNDER	HURTUBISE TOWNSHIP			
Tomlinson	32E/05	Noranda Expl. Co. Ltd. "Cunningham Property"	Au	Assess	AMag	1987	2.10308	
Tomlinson	32E/05 32E/12	Noranda Expl. Co. Ltd. "Kabika Prop."	SEE	UNDER	BRADETTE TOWNSHIP			
Tomlinson	42H/08	Pan East Res. Inc.	SEE	UNDER	NEWMAN TOWNSHIP			
Tweed	42H/08	Glen Auden Res. Ltd. "Blakelock-Tweed Twp. Area"	SEE	UNDER	BLAKELOCK TOWNSHIP			
Walker	42A/10	Cosby, M.S.	Au	Assess	Mag Gc	1985 1987	2.9679 2.9792	
Walker	42A/10	Golden Grail Res. Ltd.	Au	Assess	DD (1) 337'	1986		
Wesley	42A/16	Utah Mines Ltd.	SEE	UNDER	MOODY TOWNSHIP			
Wilkie	42A/10	Canamax Res. Inc. "Carr 1 & 2"	Au	Assess	DD (2) 1,702'	1987		
Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 31"	Au	Assess	DD (4) 3,952'	1987		
Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Claim L 943260"	Au	Assess	Rad Mag VLF-EM	1987	2.10053	
Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Main Group"	SEE	UNDER	BEATTY TOWNSHIP			
Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Wilkie-Carr Group"	Au	Assess	DD (2) 655' SA	1986 1987	 2.9973	

Canreos Minerals (1980) Limited optioned the Melba Gold Mine property in Melba Township from Nordex Explosives and started a $500 000 exploration program. Earlier work on the property had established minimum reserves of 20 000 tons grading 0.25 ounce gold per ton and includes drill intersections of 2.55 ounces gold per ton over 4.3 feet. 0.42 ounce gold per ton over 6.5 feet, and 1.49 ounce gold per ton over 3 feet (The Northern Miner, September 14, 1987).

Eastmaque Gold Mines Limited completed construction of its 2000 ton per day tailings mill and by December 1987, had begun to put trial runs of tailings through the mill. The thickener and ball mill remain to be installed and full production will begin early in 1988. A flotation concentrate will be produced and shipped to Noranda for further processing. Eastmaque Gold Mines Limited has access to 7 700 000 tons of tailings which average 0.038 ounce gold per ton.

Glen Auden Resources Limited, along with 14 joint venture partners, will spend up to $10 million west of the Casa Berardi area, in Ontario north of Lake Abitibi. Glen Auden Resources Limited has almost 2000 claims in the area from Tweed to St. Laurent Townships. Work done to date includes airborne geophysical surveys, satellite image interpretation, and some diamond drilling.

When Golden Shield Resources Limited purchased the Kerr Addison Mine, they also acquired Kerr Addison Mines Limited's interest in the Cheminis Property of International Larder Minerals Incorporated. Golden Shield Resources Limited also acquired the Eldor Resources Limited interest in the Cheminis Property. Exploration work by Eldor Resources Limited and Kerr Addison Mines Limited, along with Northfield Minerals Incorporated and Northern Ranger Oil and Gas Limited. has delineated reserves of 272 000 tons grading 0.174 ounce gold per ton in the upper levels and a larger zone at depth. During the summer of 1987, the 1000-foot Cheminis shaft was dewatered and rehabilitated in order to conduct bulk sampling and underground diamond drilling. If sufficient tonnage is indicated, the ore will be milled at the Golden Shield Resources Limited Kerr Mine (formerly the Kerr Addison Mine), five miles to the east.

Goldteck Mines Limited (formerly Errington Gold Exploration) bought the Stairs Mine in Midlothian Township from Regal Goldfields Limited for $5 million in October 1986. A $2.7 million surface exploration was undertaken to explore the potential of new gold zones. The Stairs Mine operated between 1964 and 1966, and produced over 3500 ounces of gold from 15 000 tons of ore.

HSK Minerals Limited and Joutel Resources Limited each acquired 20.75 percent of Queenston Gold Mines Limited for $4 million each from the Canadian Imperial Bank of Commerce. HSK has been aggressively exploring in the Kirkland Lake area and, pending financing arrangements with Northfield Minerals Incorporated, a $50 million exploration program over five years will be done on Queenston's Kirkland West Property, immediately west of Lac Minerals Limited's Macassa Mine. The property is 1200 feet west of Macassa's new 7225 shaft. On the Vigrass Lake Property west of Kirkland Lake in Otto Township, follow-up work is being done based on results from 1986 surface trenching (0.363 ounce gold per ton over five feet).

Inco Gold and Queenston Gold Mines Limited are sinking a ramp to the 735-foot level on the Anoki Property in Gauthier Township west of the recently shut down McBean Mine. Previous exploration here outlined reserves of 600 000 tons grading 0.145 ounce gold per ton to a depth of 800 feet. The $7 million project will obtain a 50 000 ton bulk sample and some 30 000 feet of underground drilling will be done. Surface drilling will also be done on the Biroco and Esker zones two miles southwest of the Anoki Property. The two companies are actively searching for mill feed for their jointly owned McBean Mill (65 percent Inco Gold, 35 percent Queenston Gold Mines Limited) since Golden Shield Resources Limited closed the Mirado Mine.

The Lenora Explorations Limited Omega Mine in McVittie Township northeast of Larder Mine will ship up to 50 000 tons of ore from an open pit to Belmoral Mines Limited's mill at the Ferderber Mine in Quebec. This bulk sample will help determine the feasibility of mining the deposit via a ramp. Reserves to date are 280 000 tons grading 0.16 ounce gold per ton (Canadian Mines Handbook 1987–88).

Lytton Minerals Limited has entered an agreement with Dolly Varden Minerals Incorporated to explore the formerly producing Bidgood Kirkland Mine in Lebel Township east of Kirkland Lake. The mine produced 160 000 ounces of gold from 586 000 tons of ore between 1934 and 1949.

Minnova Incorporated acquired the Kirana Kirkland Property in northeastern Teck Township from Nova Beaucage Mines Limited. Minnova Incorporated can earn a 75 percent interest in the property by spending $4 million. The property has five old shafts and 3000 feet of underground workings with indicated reserves of 50 000 tons grading 0.40 ounce gold per ton above the 275-foot level. Work done so far includes line cutting, ground geophysics, and diamond drilling.

Newfields Minerals Incorporated optioned the formerly producing Teck–Hughes and Kirkland Minerals properties from Teck Corporation. A drilling program is being implemented on the property designed to test the extent of Lake Shore Mines Limited's "Narrows Break" and Macassa's "04 Break" on the Teck–Hughes Property. On the basis of several good drill intersections (9.8 feet of 0.35 ounce gold per ton, 13.7 feet of 0.82 ounce gold per ton, 22.0 feet of 0.25 ounce gold per ton), a deal was made with Lac Minerals Limited to access the old workings using the Lake Shore No.5 shaft, which was recently shut down. Access to the "Narrows Break" can be gained via a drift on the Break on the 3075-foot level. The company hopes to establish reserves up to 375 000 tons averaging 0.25 ounce gold per ton. Total cost of the project, including shaft rehabilitation, drilling, and rent is expected to be around $4 million (Northern Daily News, October 28, 1987).

Newmont Exploration of Canada Limited, along with joint venture partner Pamorex Minerals Incorporated (formerly Consolidated CSA Minerals Incorporated), continued to explore on the Mikwam project in Hoblitzell, Noseworthy, and Bradette Townships in the Ontario extension of the Casa–Berardi area. Drilling, in 1987, has outlined further anomalous gold values which enhance previous intersections of 0.12 ounce gold per ton over 24.7 feet and 0.52 ounce gold per ton over 5.2 feet.

Shenandoah Resources Limited continued exploration on the Kennedy–Boston and Miller Independence properties in the Boston Creek area.

MATACHEWAN–KIRKLAND LAKE–LARDER LAKE GOLD STUDY, 1987 TO 1991 by Howard Lovell

Matachewan–Kirkland Lake–Larder Lake gold mine production, since the very first intermittent production at Kerr Addison and Swastika, in 1906 and 1910 respectively, to the end of 1985, totals 36 792 520 ounces of gold (0.31 ounce gold per ton) and 6 031 310 ounces of silver from 111 283 221 tons milled. In Canada, this gold production is surpassed only by that of the Timmins area.

Gold exploration and development has increased markedly in the Matachewan–Kirkland Lake–Larder Lake area (*see* Figure 11.2) particularly in 1987. This has made available for examination, increased amounts of diamond-drill core and excellent exposures of bedrock stripped of its soil cover.

Government maps have been published, or the field work is completed and scheduled to be published, for outcrop geology, soil types and distribution, soil depth to bedrock, landforms, topography, gravity, and also airborne magnetism, electromagnetism, and radioactivity for most of the area known to contain rock types and structures favourable for concentrations of gold.

In September 1987, the field work began on a four-year project dealing with gold host rocks and their original environments of emplacement. The project will concentrate on stratigraphy, sedimentation, and depositional environments. During this first year of the project, government, exploration industry, and university research information for the area was amassed, correlated, and organized for ready reference.

Properties visited included

Golden Shield Resources Limited's Barber Larder property, which was stripped and prepared for open pit production;

Canadian Gold Resources Incorporated's Kirk Royal property, whose shaft was dewatered in order to sample and drill underground; and

Golden Shield Resources Limited's Cheminis Mine

RECOMMENDATIONS FOR GOLD EXPLORATION by Howard Lovell

"Just follow the yellow brick road"

In 1987, the 55 km long Kirkland Lake–Larder Lake gold belt along Highway 66 underwent more exploration and development activity than in any other year since shortly after the Second World War. The Kirkland Lake–Larder Lake gold producers, past producers, and other deposits total 10 km of strike length, occurring *en echelon* at separations averaging 4 km between deposits. This constitutes much greater continuity, roughly along strike, than known gold concentrations, e.g., in the "black and white smokers" of the Pacific Ocean, offshore from North America, and is comparable with Ontario's Timmins area. The major gaps in gold occurrences are along strike, west and east of the Kirkland Lake–Larder Lake gold belt where younger (Huronian) undeformed sedimentary rocks cover half of the gold belt that extends east from the Stairs past producer west of Matachewan, into Quebec Province, east of the Kerr Mine of Golden Shield Resources Limited. In addition to soil cover, these younger, covering sedimentary rocks fill approximately strata-bound linear depressions in the basement rocks, preventing the conventional prospecting that succeeded in discovering most of the known gold occurrences.

The Kirkland Lake–Larder Lake gold is spatially related to, and predominantly flanking and offshore from, polymictic conglomerate, sandstone deltaic, and nearby beach sediments (Lovell *et al.* 1987, p.214-216). This gold belt delineates the shallow shelf of a sea, marginal to subaerially eroding calc-alkalic to alkalic volcanic piles (Dimroth *et al.* 1982) as illustrated by Jensen (1980, p.62). Because the shallow shelf's gold-bearing sediments were fine-grained clays and other micaceous minerals, with siliceous and carbonate cement, and they underwent basin margin faulting and folding; many now are schist and shear zones. The schist and shear zones formed where adjustments of volume and space were accommodated, e.g., during folding involving volcanic flows and these intercalated sedimentary rocks. The sedimentary rocks are friable and to an extent leachable. Therefore they were eroded so as to result in gold-bearing shear zone depressions conforming closely with stratigraphy. The deepest shear zone depressions in basement rocks were filled with the younger, covering sedimentary rocks.

Gravity and vertical-gradient magnetometer surveys, followed by diamond drilling (some of it through more than 300 m of overlying younger sedimentary rocks and soil cover), may be the most direct approach for exploring what eluded the minefinder prospectors because of their less technically advanced equipment.

DRILL CORE LIBRARY by Dave Guindon

The Drill Core Library (Lithotheque) for the Larder Lake Mining Division was opened in June, 1984. At present, 162 615 m of core are stored, representing 233 852 m of drilling.

In 1987, approximately 19 863 m of drill core were collected, catalogued, and stored. Changes in the Mining Division boundaries, that took effect in February 1987, required 2687.1 m of core to be sent to Timmins. This core is now included in the Timmins system. Approximately 10 700 m of core will go to Cobalt in the future. The core destined for Cobalt has been palletized and is stored at our outside storage location. Figure 11.3 shows the location of the drill holes from which the core has been stored in the library. Table 11.4 is a summary of core stored for each township, by company.

The computer system at the core libraries has been updated during the past year. More information will be stored, with the ability to cross reference holes based on multiple, alternate, and property names.

Assistance at the Core Library was provided by: F. Kiernicki, Les Smith, and Mark Gaudreau, Geological Assistants; Guy Rivest, Mark Conway, and Gary Delenardo, Experience '87.

The Core Library is located west of Kirkland Lake, on the southern side of Highway 66, at the Ontario Ministry of Natural Resources District Office. Persons wishing to examine or donate core should telephone (705) 642-3222 Ext. 169, or write to:

Drill Core Library
Ontario Ministry of Northern Development and Mines
P.O. Box 129
Swastika, Ontario
POK 1TO

OPERATION BLACK RIVER-MATHESON (BRIM)

INTRODUCTION

Operation Black River-Matheson (BRiM) is a multidisciplinary program focussed on 40 townships extending from Night Hawk Lake, eastward to the Ontario-Quebec interprovincial boundary (*see* Figure 11.2). Funded equally by the Ontario Ministry of Northern Development and Mines and the Ontario Ministry of Natural Resources, the program has been designed to stimulate the economy of northern Ontario in the long term, via mineral exploration incentives. These incentives are being provided through the development of a geoscience data base which will contribute to the discovery of mines. The goals of the program are being realized through contributions from the Geophysics-Geochemistry, Precambrian Geology, and Engineering and Terrain Geology Sections of the Ontario Geological Survey, and the Kirkland Lake and Timmins Resident Geologists' Offices.

ONGOING ACTIVITIES

During the 1987 field season, in addition to analyzing bedrock samples obtained from the 1987 overburden rotasonic drilling program (see below), a limited amount of reconnaissance scale bedrock geological mapping in the northern BRiM area was performed by geologists with the Precambrian Geology Section of the Ontario Geological Survey (Gupta and Johnstone 1987). The mapping was performed as part of a regional gravity survey that was conducted by the Geophysics-Geochemistry Section of the Ontario Geological Survey. The survey was focussed on a 7200 km^2 area of the Abitibi Greenstone Belt that is located north of Matheson and that is bounded to the south, approximately, by Highway 101. Results of the 1987 geological mapping have allowed an improved bedrock geology map of the area to be compiled (Gupta and Johnstone 1987). This map will assist in the interpretation of the gravity data, which in turn will assist when succeeding maps of the area's geology are compiled. The gravity survey represents a continuation of the gravity survey completed south of Highway 101 during the 1984 and 1985 field seasons, the results of which are expected to appear in March 1987, as an Ontario Geological Survey Open File Report. The report will include 1:100 000 scale maps of Bouguer gravity and various gravity filter products.

Geologists with the Geophysics-Geochemistry, and Engineering and Terrain Geology Sections of the Ontario Geological Survey continued programs of overburden rotasonic drilling, backhoe trenching, and hand pitting in 1987 (Steele and Baker 1987). The 72-hole rotasonic drilling program, in the winter of 1987, completed the overburden drilling that was scheduled for the west and central BRiM areas. Analytical results from the 1987 drilling program are anticipated to be available in both datasheet and floppy disk formats in 1988, and will complement data obtained from previous BRiM overburden rotasonic drilling programs (currently available on both media). During June, a limited program of near surface till sampling, using a backhoe and hand dug pits, was performed, completing this component of the BRiM overburden sampling program. Analytical results of the 1987 till sampling program are expected to be available in datasheet format in 1988.

As part of Operation Black River-Matheson, an economic geologist is based in Kirkland Lake, to encourage exploration activity at the local level by being available to all members of the exploration community, as a source of exploration-related information and advice. Efforts of the economic geologist are directed toward promoting the BRiM area, catalyzing the property optioning process, interfacing between the public and private sectors, and, in general, providing services that facilitate exploration. Specifically, the economic geologist is available to

1) assist local prospectors with property visits, advice, and assessment file searches;
2) document new mineral occurrences;
3) more fully describe previously documented mineral occurrences;
4) compile data relevant to exploration;
5) help "orient" new workers to the area.

Activities of the BRiM economic geologist during 1987 are described in Bath (1987).

The Geological Data Inventory Folio (GDIF) component of BRiM was completed during 1987. Compilation of GDIFs for all townships in the BRiM area except Rand (which was not compiled) have been completed, and all but five (those for Hislop, McCool, Michaud, Stock, and Warden Townships) are available as of November, 1987. The five GDIFs which are not yet published should be so in the near future.

As of December 1, 1987, about 53 400 m of core from 664 diamond-drill and overburden drilling holes, representing in excess of 92 000 m of drilling in the BRiM area have been cataloged and shelved, and are available for examination and sampling at the Larder Lake and Porcupine Mining Division Drill Core Storage Libraries.

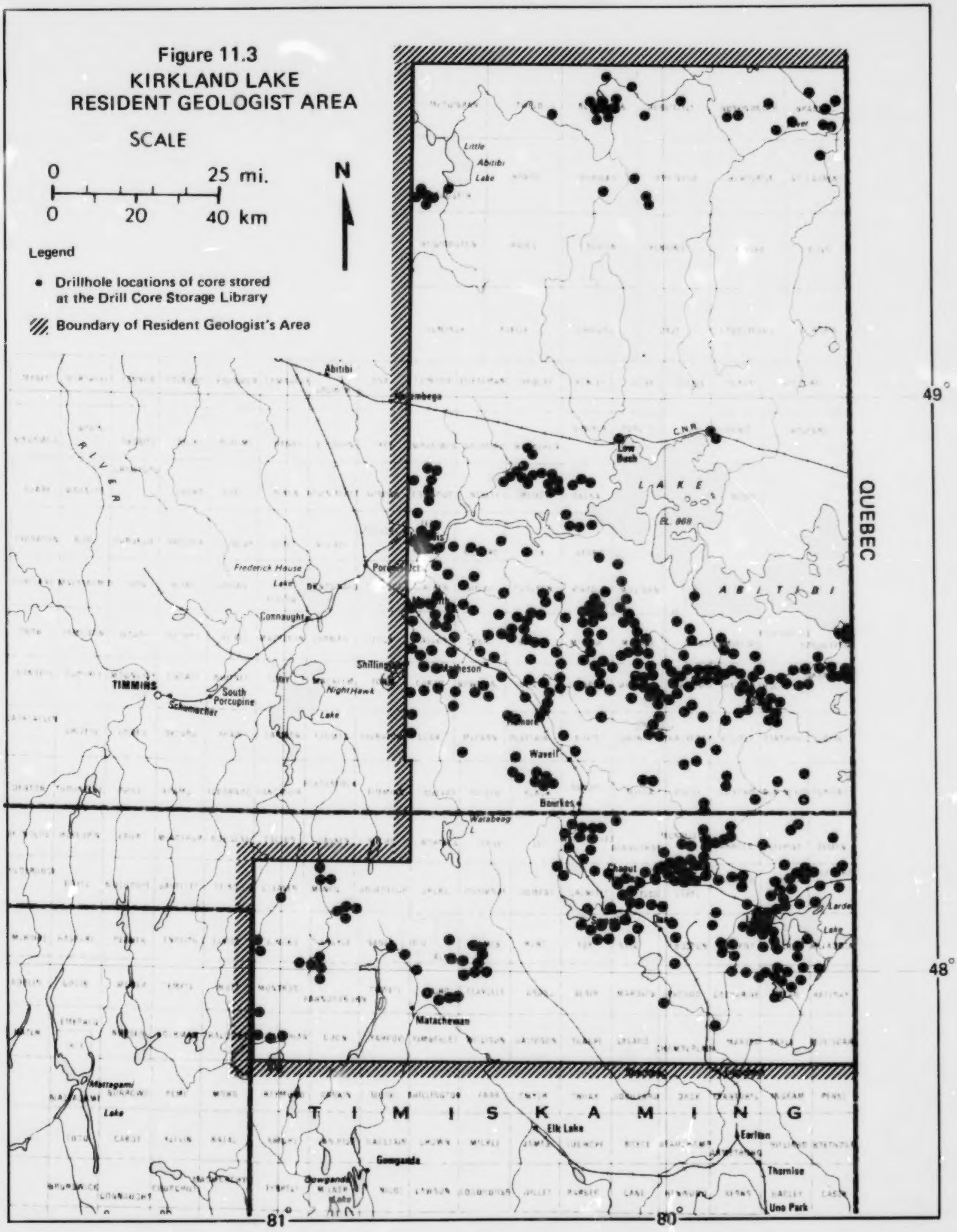


Figure 11.3
KIRKLAND LAKE
RESIDENT GEOLOGIST AREA

SCALE
0
25 mi.
0
20
40 km
N
Legend
● Drillhole locations of core stored at the Drill Core Storage Library
▨ Boundary of Resident Geologist's Area
Little Abitibi Lake
Abitibi
CNR
Low Bush
LAKE
ABITIBI
QUEBEC
49°
48°
81°
80°
RIVER
Frederick House Lake
Porcupine Jct.
Connaught
Shillington
Matheson
Night Hawk Lake
TIMMINS
Schumacher
South Porcupine
Ramore
Wavell
Bourkes
Watabeag L.
Matachewan
Mattagami Lake
Chaput
Larder Lake
TIMISKAMING
Elk Lake
Earlton
Gowganda
Gowganda Lake
Thornloe
Uno Park

TABLE 11.4 CORE STORED AT THE KIRKLAND LAKE DRILL CORE LIBRARY

TOWNSHIP	NUMBER OF HOLES	TOTAL DEPTH	CORE STORED INSIDE	CORE STORED OUTSIDE
Alma	7	420.1	296.3	0.0
Argyle	13	1048.7	89.4	0.0
Arnold	12	1864.7	1649.1	46.6
Asquith	21	1239.0	0.0	896.2
Baden	3	105.7	92.0	0.0
Bannockburn	8	526.8	310.6	0.0
Barnet	9	1369.2	135.7	0.0
Beatty	43	5646.4	2163.9	363.6
Ben Nevis	2	442.8	295.9	0.0
Benoit	3	645.6	627.6	0.0
Bernhardt	8	871.7	129.8	0.0
Bisley	6	532.3	387.5	0.0
Black	46	4863.3	2198.4	2063.8
Blakelock	16	1525.0	1153.5	0.0
Bompas	1	91.4	87.2	0.0
Boston	8	763.4	582.1	0.0
Bowman	10	927.4	671.5	10.4
Bradette	13	2979.1	2062.4	0.0
Bryce	9	1146.3	0.0	1106.2
Burrows	15	2217.9	0.0	1682.7
Cabot	1	212.4	0.0	129.5
Cairo	17	2195.0	2003.9	0.0
Carr	10	677.5	397.0	17.4
Casey	1	232.0	0.0	205.1
Catharine	52	8774.1	1336.7	6754.0
Churchill	25	1486.7	0.0	1383.2
Cleaver	2	323.4	4.0	0.0
Clifford	6	690.1	420.5	0.0
Connaught	4	515.4	0.0	488.4
Cook	6	339.9	191.0	12.8
Coulson	5	532.0	444.9	0.0
Currie	34	4176.0	1124.0	1860.5
Eby	26	1970.9	1760.7	0.0
Edwards	10	1[illegible]41.9	561.5	0.0
Egan	2	51.2	26.7	0.0
Elliott	3	320.9	287.7	10.4
Flavelle	4	612.8	579.7	0.0
Galna	9	2187.2	581.4	0.0
Garrison	31	4036.8	3146.8	100.4
Gauthier	9	1321.8	1151.9	0.0
Grenfell	23	1710.3	1288.7	288.3
Guibord	15	2041.4	138.1	59.9
Harker	121	16039.2	9852.9	4202.8
Hearst	37	6270.7	2181.3	480.3
Henwood	1	2335.4	0.0	1923.9
Hincks	4	782.1	742.5	0.0
Hislop	20	2014.1	618.3	61.9
Hoblitzell	2	178.9	101.2	0.0
Holloway	70	13466.1	8995.4	1382.2
Holmes	11	972.1	865.6	0.0
Ingram	2	267.6	0.0	2.9
Katrine	22	1387.8	1316.9	0.0

TABLE 11.4 Continued

Kerrs	6	1328.3	646.9	0.0
Knight	14	2838.7	0.0	1539.5
Knox	1	111.0	89.4	0.0
Lamplugh	4	168.8	69.5	32.3
Lebel	94	12322.9	7505.9	4148.6
MacMurchy	9	160.1	0.0	6.2
Maisonville	49	5712.3	3634.2	1473.5
Marathon	2	546.6	432.0	0.0
Marriott	20	3040.4	2630.4	0.0
Marter	1	105.8	73.7	0.0
McCann	1	10.4	3.0	7.4
McCool	38	7301.0	1195.2	76.1
McElroy	33	3535.4	1135.0	928.6
McFadden	2	308.1	3.5	0.0
McGarry	33	4675.2	2401.3	1351.6
McNeil	23	1855.0	1411.3	106.7
McVittie	168	17001.0	12757.5	2168.9
Melba	9	1463.4	1093.7	0.0
Michaud	27	4103.4	1017.9	561.7
Midlothian	21	3283.6	1590.0	306.2
Milligan	4	364.1	166.3	73.8
Milner	3	126.5	0.0	1.8
Montrose	5	721.4	673.2	0.0
Moody	28	7878.0	3575.6	198.1
Morrisette	28	2601.1	2239.2	0.0
Munro	37	4186.2	1827.7	33.2
Natal	7	1323.1	0.0	525.2
Newman	3	310.9	159.0	0.0
North Williams	1	30.8	0.0	1.0
Noseworthy	5	926.3	772.3	0.0
Ossian	3	415.8	360.6	0.0
Otto	9	881.2	804.6	0.0
Pacaud	3	317.6	310.0	0.0
Pense	5	565.5	0.0	8.2
Playfair	5	620.0	393.3	21.0
Powell	1	121.6	1.4	0.0
Purvis	1	215.2	143.3	0.0
Rand	6	319.4	81.4	38.0
Rattray	2	214.0	2.3	0.0
Rickard	4	695.0	432.5	0.0
Robillard	4	235.9	0.0	94.5
Sangster	5	664.1	601.6	0.0
Skead	25	2904.8	164.5	0.0
St. Laurent	3	457.8	421.8	0.0
Steele	3	601.1	503.5	0.0
Stoughton	8	896.3	799.1	0.0
Tannahill	14	2467.6	561.2	1531.3
Taylor	13	1325.9	62.0	32.8
Teck	145	13842.9	10074.8	1396.9
Teefy	16	2624.7	1342.6	0.0
Thackeray	4	368.6	10.7	29.6
Tomlinson	3	406.3	217.0	0.0
Tweed	2	196.6	140.5	0.0
Tyrrell	8	1341.7	0.0	749.4
Walker	13	1261.4	641.9	9.1
Warden	8	707.2	112.7	23.2
Wesley	1	323.7	254.8	0.0
Wilkie	8	1641.0	851.6	0.0

TABLE 11.5. MAPS AND REPORTS PERTAINING TO THE BRIM AREA PUBLISHED DURING 1987 BY THE OGS AND MNDM.

Township	Misc. Reports	Maps
BRiM	OFR 5653	
Barnet	GDIF 349	
Beatty		
Bond	GDIF 383	80892
Bowman		
Carr		
Clergue	GDIF 400	
Cook	GDIF 356	80893, 80843
Coulson	GDIF 369	
Currie		
Dokis	GDIF 352	
Egan	GDIF 342	80890, 80891
Elliott	GDIF 350	80840
Frecheville		
Garrison	GDIF 360	80875, 80886, 80844
Guibord	GDIF 399	80843
Harker	GDIF 358	80875, 80876, 80877, 80878, 80885, 80840
Hislop		
Holloway		80882, 80883, 80885, 80838
Lamplugh		80879, 80880, 80881, 80839
Marriott		80838
McCann	GDIF 343	
McCool		80887, 80842
Michaud		80843
Milligan	GDIF 370	80842
Munro	GDIF 361	80842
Playfair	GDIF 344	
Rand		80841
Sheraton	GDIF 402	80889, 80890
Stock		
Stoughton		80884, 80838
Tannahill	GIDF 351	
Taylor		80893
Thackeray	GDIF 357	80841
*Thomas		80888
Walker	GDIF 368	
Warden		80842
Wilkie	GDIF 401	

*not in BRiM

EXPLORATION ACTIVITES IN THE BRIM AREA

A brief description of several of the exploration activities carried out in the BRiM area during 1987 appears below. Locations of the projects appear in Figure 11.1. Summaries of additional exploration programs appear in Table 11.3.

Ateba Mines Limited performed a program of ground magnetic and very low frequency electromagnetic (VLF) surveying, overburden reverse circulation drilling (RCD), and a downhole induced polarization (IP) survey on a 52-claim property in McCool and Munro Townships that is held by Arkroy Resources. Interest in the ground is reported to have resulted (The Northern Miner, July 20, 1987) from gold grain distribution data generated by the Ontario Geological Survey as part of Operation Black River–Matheson.

In 1986, American Barrick Resources Corporation formally announced its plans to develop the Holt--McDermott Mine in northern Holloway Township, at a cost of $52 million. Development work during 1987, consisted of exploration and development drifting on the 100 m, 150 m, 200 m, 350 m levels with access provided via a 3-compartment, 420 m deep vertical shaft which was completed in 1986. Construction of the surface complex, including a 1500 t per day mill, and a two-storey office building housing a warehouse, dry, and hoist room was initiated in 1987. Diamond-drill-indicated reserves at the Holt--McDermott Mine, as of March 6, 1987, were 3.024 million tonnes averaging 6.41 g/t gold using a 3.4 g/t gold cut-off. Carbon-in-leach winning methods are anticipated to yield 93 to 95 percent gold recoveries (Canadian Mining Journal, July 1987). Aggregate underground exploration and development work completed at the Holt–McDermott Mine as of November 30, 1987, include 2723 m of drifting, 434 m of crosscutting, 486 m of raising (in waste) and 34 775 m of diamond drilling. Surface diamond drilling on the Holt–McDermott Property, and on additional properties in the Harker–Holloway Township area by American Barrick Resources Corporation, amounted to about 100 000 feet in 1987. This figure includes drilling on the Worvest Option (65 percent American Barrick Resources Corporation, 35 percent Lenora Explorations Limited) located immediately west of the Holt–McDermott Property, which contains drill-indicated reserves of 968 672 tons averaging 0.134 ounce gold per ton. American Barrick Resources Corporation intends to develop a haulageway extending from the Holt–McDermott workings, on the 300 m level, into the Worvest claims (The Northern Miner, November 9, 1987).

Bruneau Mining Corporation and Montclerg Resources Limited have reached an agreement in principle for Bruneau Mining Corporation to earn a 60 percent interest in the Montclerg Resources Limited deposit in Clergue and Walker Townships. Previous diamond drilling on the property has delineated reserves in excess of 370 000 tons averaging 0.132 ounce gold per ton (The Northern Miner, March 2, 1987). Ground magnetic surveys and diamond drilling were completed by Bruneau Mining Corporation on the property in 1987.

Canamax Resources Incorporated initiated a $2.6 million underground exploration and bulk sampling program on the Matheson Project 42 East Deposit in northern Holloway Township, where diamond-drill-defined reserves are 576 000 tons averaging 0.216 ounce gold per ton (The Northern Miner, June 22, 1987). As of late November, construction of an on-site office building, shop, and mine dry had been completed. A decline ramp now accesses the third (110 m) level and drifting on the first (30 m) and second (70 m) levels has been initiated. Underground exploration and definition diamond drilling is currently in progress. A 7900-ton bulk sample has been trucked to the McBean Mill for metallurgical testing, and a feasibility study is scheduled for completion in 1988.

The Matheson Project Mattawasaga Deposit, also in northern Holloway Township, is located immediately east of the American Barrick Resources Corporation Holt–McDermott Deposit, and was also a focus for Canamax Resources Incorporated in 1987. Canamax completed 68 diamond-drill holes aggregating 13 108 m on its Matheson Project in 1987; of this, about 40 holes were targeted on the Mattawasaga Deposit.

Canamax Resources Incorporated was active in Stock Township, where 73 step out and definition diamond-drill holes aggregating 11 731 m at the Clavos Project (a Canamax–Bruneau joint venture) were completed. Recently reported diamond-drill-delineated reserves at Clavos are 1.16 million tons averaging 0.149 ounce gold per ton contained within 4 distinct mineralized zones. The most recently discovered mineralized zone (the 960 East Zone) was found early in 1987. A 300 m exploration shaft, to be sunk on the Clavos Discovery Zone, is tentatively planned pending further encouraging results and a favorable prefeasibility study (Canamax Resources Incorporated, Annual Report 1986, May, 1987). In Munro Township, Canamax Resources Incorporated diamond drilled the Lalonde prospect.

Card Lake Resources Limited diamond drilled 15 000 feet on the Demers group of patented claims in Harker Township.

Chevron Minerals Limited was active on several properties within the BRiM area. On the Gunnar property in Hislop Township (a Stroud Resources Limited joint venture), airborne geophysics, surface stripping, geochemical sampling, and diamond drilling were completed. In Cook, Guibord, and Barnet Townships, geochemical sampling, geological mapping, and several hundred metres of diamond drilling were completed on the Pike River Project (a joint venture with St. Joe Canada Incorporated). In Currie Township, Chevron Minerals Limited completed an IP survey and an RCD program on one claim group, and diamond drilling on another.

Coastoro Resources Limited initiated a diamond-drilling program in northern Garrison Township on Jonpol Explorations Limited's Linton and Brydges patented claim groups, in which it may earn an interest.

Cominco Limited performed both ground magnetic and IP surveys, and diamond drilled 2243 m in 16 holes on its Telgar property (a joint venture with Vanstates Resources Limited) in Thackeray Township. On the Garrcon Property in northern Garrison Township, Cominco Limited (operator) and Jonpol Explorations Limited constructed a core storage facility and completed 34 450 feet of diamond drilling in 36 holes.

Aggregate diamond drilling on the Garrcon Property during the past three years amounts to 49 320 feet in 61 holes, which have delineated anomalous gold mineralization in three zones. Results of the 1987 diamond drilling are anticipated to enable revised grade and tonnage estimates to be made (Jonpol Explorations Limited, Interim Report to the Shareholders, September 30, 1987); previously defined reserves in the vicinity of the old shaft area were reported to be 1.5 million tons averaging 0.04 ounce gold per ton above the 200-foot level (Jonpol Explorations Limited, Annual Report, 1987).

Dickenson Mines Limited completed 10 diamond-drill holes aggregating 7629 feet on the Neal option in northeastern Holloway Township and performed lithogeochemical sampling in Marriott Township.

Esso Minerals Canada Limited diamond drilled 16 holes aggregating about 16 000 feet in the Taylor–Stock Townships area.

Falconbridge Limited continued to explore its claims in the Ludgate Lake area in central Michaud Township. As of November 1987, about 3000 m in 14 holes had been diamond drilled on the property during 1987, and drilling at that time was continuing. Previous diamond drilling on the property was reported to have delineated about 1 million tons averaging 0.09 ounce gold per ton (The Northern Miner, September 13, 1984) in the Ludgate Zone. Recent drilling has been concentrated at least in part on the western extension of the Ludgate Zone (The Northern Miner, November 23, 1987).

The Ross Mine, located in southeastern Hislop Township and owned and operated by Giant Yellowknife Mines Limited, continued to produce gold and silver during 1987, as it has continuously since 1936. It was recently estimated that the Ross Mine shall have produced its one-millionth ounce of gold by the end of 1987, while as of late 1986, cumulative silver production was estimated to be about 1.4 million ounces (Troop 1986). Significant by-product copper has also been recovered from the mine in recent years.

Glimmer Resources Incorporated completed geological mapping, ground magnetic and IP surveys, and about 200 m of trenching on 108 claims in southeastern Barnet Township.

Golden Shield Resources Limited diamond drilled six holes aggregating about 3000 feet in Guibord Township.

In Hislop Township, Goldpost Resources Incorporated completed a 1100-foot decline ramp on the Hislop (Gibson) West zone in March, performed about 200 feet of crosscutting, and diamond drilled 56 holes, aggregating 25 880 feet, from underground. The decline ramp is currently (November 1987) being extended an additional 1900 feet to access the 400-foot level. The ramp extension will allow a 1000-foot drift to be driven on the 400-foot level, enabling gold reserves to be established (The Northern Miner, November 16, 1987). On the Hislop East property (the Kelore Mine area), Goldpost drilled 156 diamond-drill holes aggregating 48 872 feet, in 1987. This drilling has enabled preliminary reserve estimates of 600 000 tons averaging 0.21 ounce gold per ton, to be made. Thirteen holes aggregating 7610 feet were diamond drilled on the Valliere claims in Hislop Township where an additional 3000 feet is anticipated to have been drilled by the end of 1987. Four diamond-drill holes, totalling 936 feet, were also drilled in west-central Guibord Township.

A 9-hole diamond-drilling program (aggregating 5313 feet) on the Grandad Resources Limited property in Harker Township was completed in February 1987.

Hedman Resources Limited continued to produce Hedmanite (serpentine filler) from its open pit mine in Warden Township. Hedman Resources Limited has also embarked on a gold exploration program which is being concentrated on a large (560 claims) group in Milligan, McCool, Munro, Warden, Coulson, Knox, and Kerr Townships. Ground geophysical surveys along 440 line-kilometres of cut line are scheduled to start in late 1987, on these claims.

Lacana Mining Corporation cleaned out old trenches, conducted geological mapping and prospecting, and completed an IP survey on the Talisman property in northern Guibord Township. In northwestern Michaud Township, Lacana conducted ground magnetic and IP surveys and, as of December 1987, had completed about 6000 feet of diamond drilling, in nine holes. On a separate property in northwestern Michaud Township, Lacana conducted an IP survey.

Lac Minerals Limited completed IP surveys and 20 diamond-drill holes aggregating 15 000 feet, on the (patented) Wright–Hargreaves and Hastings claim groups in northern Garrison Township.

Lencourt Limited conducted geological mapping, ground geological surveys, and overburden stripping, and anticipates beginning an RCD program on the Hyde prospect in McCann Township.

Lenora Explorations Limited performed surface diamond drilling and drove a decline ramp to the 250-foot level at the Golden Harker Deposit in southeastern Harker Township. Subsequent to mining a 50 000-ton bulk sample from the 250-foot level, underground exploration plans include extending the ramp to the 375-foot level and driving an exploration drift to the west on the 250-foot level. Reserves on the property were recently reported to be 186 000 tons averaging 0.16 ounce gold per ton (The Northern Miner, November 16, 1987).

Maude Lake Gold Mines Limited completed ground VLF and radiometric surveys in the Beatty Township area, and Freeport–McMoran Gold Company completed about 16 000 feet of diamond drilling on Maude Lake Gold Mines Limited's No.5 gold deposit in northeastern Beatty Township. Equinox Resources Limited recently acquired the right to earn a 60 percent interest in the Maude Lake Gold Mines Limited properties and began driving an exploration decline ramp to the 500-foot level on the No.5 deposit, in November 1987. Drill-defined reserves at the No.5 deposit currently stand at 1 million tons averaging 0.204 ounce gold per ton (The Northern Miner, November 9, 1987).

In east-central Michaud Township, Moneta Porcupine Mines Incorporated completed ground magnetic, VLF and IP surveys, an overburden RCD program and about 40 000 feet of diamond drilling on its wholly owned property and on an adjacent 86-claim property, which it recently optioned from Nahanni Mines Limited. Diamond drilling on these properties has established the presence of two distinct northeast-trending auriferous zones. The northern zone is associated with the Porcupine Destor Fault Zone whereas the southern zone (located about 3000 feet south of the north zone) is associated with steeply dipping, altered metasedimentary rocks (including iron formation) of the Kinojevis Group.

Newmont Exploration of Canada Limited completed IP surveys and 24 000 feet of diamond drilling in 28 holes on the Teddy Bear and Lightval patented claims in northern Harker and Holloway Townships. IP surveys and overburden drilling were also completed on a property in Holloway Township.

Noranda Exploration Company Limited diamond drilled 25 holes aggregating about 18 000 feet in northern Holloway Township; backhoe-sampled till, and diamond drilled seven holes (aggregating about 3000 feet) in southwest Garrison Township; conducted trenching and RCD programs in northeastern Barnet Township; diamond drilled nine holes aggregating about 6000 feet in northern Stoughton Township; and diamond drilled on properties in Frecheville and Stock Townships. Noranda and Destiny Resources Limited intersected anomalous gold mineralization associated with both a carbonate zone and iron formation on the Windjammer property in Michaud Township, northeast of the Moneta Porcupine Mines Incorporated properties (The Northern Miner, November 16, 1987).

Nufort Resources Incorporated conducted prospecting, geological mapping, ground geophysical surveys, and diamond drilling on its Border prospect in northern Stoughton Township, where anomalous gold assays have been obtained from quartz veins hosted by a carbonate zone.

Pamorex Minerals Incorporated completed geophysical surveys, an RCD program, and about 2000 feet of diamond drilling in Guibord Township as well as IP surveys, an RCD program, and about 5000 feet of diamond drilling in Beatty and Hislop Townships.

Perrex Resources Incorporated completed about 200 line-miles of IP surveys on various properties in the Harker–Holloway Township area. About 23 000 feet of diamond drilling in 35 holes, as well as extensive overburden stripping, was completed on the Iris property in southeastern Harker Township. Approximately 33 000 feet of diamond drilling in 33 holes was completed through November, 1987, on the Perrex–Lac Minerals joint venture in central Harker Township; two phase diamond drilling is currently (November 1987) in progress on the property with Lac Minerals Limited acting as the managing operator. Three diamond-drill holes aggregating about 1800 feet, were also completed by Perrex Resources Incorporated in Elliott Township.

Peter Island Resources Incorporated conducted ground magnetic and gravity surveys, and a program of overburden sampling on its Tillicum gold property in Barnet and Thackeray Townships.

Placer Dome Incorporated diamond drilled 12 holes on its McCool Township Belore prospect, and completed ground magnetic and VLF surveys over two properties in Sheraton Township, two properties in Egan Township, and one claim group in Playfair Township.

Pronto Explorations Limited completed 1600 m of diamond drilling, in six holes, in Lamplugh Township.

Silverside Resources Incorporated completed IP and horizontal loop electromagnetic surveys, and till sampling, and diamond drilled 58 holes, totalling 24 061 feet, on its Garrison property, where diamond-drill-indicated reserves of 275 000 tons averaging 0.17 ounce gold per ton have been outlined, in two zones. The claims were, until recently, held by Kerr Addison Mines Limited. In 1981, Kerr Addison Mines Limited mined about 64 000 tons of material which averaged 0.138 ounce gold per ton (The Northern Miner, November 10, 1983), from an open pit on the property. Proteus Resources Incorporated and Lac Minerals Limited each have the option of earning an interest in the property by fulfilling various cash payment and work requirements over the next several years (The Northern Miner, August 31, 1987).

St. Andrew Goldfields Limited announced its decision to bring its Stock Township deposit into production, at an estimated capital cost of $15 million, following the discovery and underground exploration of the pyritic portion of the N2 Zone in 1986, and early 1987 (The Northern Miner, July 6, 1987). Construction of an on-site, 1000 tons per day mill is scheduled for 1988, with production anticipated to commence prior to year-end, 1988, at an initial milling rate of 500 tons per day. Total reserves are estimated to be about 1.5 million tons averaging 0.18 ounce gold per ton, in three zones including 762 000 tons averaging 0.23 ounce gold per ton in the N2 Zone. Through November 15, 1987, St. Andrew Goldfields Limited completed 2075 feet of underground lateral development work, 3236 cubic feet of slashing, 471 feet of raising, 20 464 feet of underground diamond drilling, and 8006 feet of surface diamond drilling on the Stock Township property.

In Taylor Township, St. Andrew Goldfields Limited (operator) and Esso Minerals Canada continued to explore both the Porphyry Zone and the Shoot Zone. In December, 1986, a vertical, 565-foot deep, 3-compartment shaft with three levels was completed on the Porphyry Zone. During 1987, underground exploration, on two levels of the Porphyry Zone included (through November 15, 1987) 1902 feet of lateral development work, 2890 cubic feet of slashing, 48 feet of raising, 21 597 feet of underground diamond drilling, and 18 695 feet of surface diamond drilling. 6683 feet of surface diamond drilling was also concentrated on the Shoot Zone, where diamond-drill-indicated reserves of 1.09 million tons averaging 0.126 ounce gold per ton were recently reported (The Northern Miner, June 29, 1987).

T & H Resources Limited diamond drilled 18 holes, aggregating 13 933 feet, on the Newfield Mines Limited patented claims in northern Garrison Township.

Thunder Valley Resources Limited conducted a 3000-foot diamond drilling program on its property in northwestern Beatty Township.

United Reef Petroleums Limited conducted diamond drilling in Guibord Township (The Northern Miner, March 9, 1987).

White Guyatt Mining Company Limited conducted geological mapping and prospecting on its property in Munro and Guibord Townships.

Wilzel Resources Limited diamond drilled two holes aggregating 1614 feet, on a 19-claim property in Coulson Township.

Winteroad Resources Limited diamond drilled 14 holes in 1987, aggregating 4079 feet, on its property in west-central Garrison Township.

Wood–Croesus Gold Mines Limited conducted a biogeochemical survey and anticipates completing, before December 31, 1987, a 2500 foot diamond-drill program on its property in southwestern Munro Township.

RECOMMENDATIONS FOR EXPLORATION

Several recent articles (Fairbairn 1985, Riddle 1983, Rogers 1982, Tilsley Associates 1984) have emphasized, with respect to gold assaying, the importance of proper sampling, laboratory sample preparation, and laboratory analytical procedure. These articles also discuss the statistical significance, meaning, and interpretation of gold assay data. Salient points from these articles, with which all members of the exploration community should be familiar, are listed below:

1) Statistically acceptable sampling, sample preparation, and analytical methods can be determined for a given type of gold mineralization only after it has been characterized in terms of such variables as gangue chemistry, where the gold occurs (e.g. is the gold associated with sulphide minerals or silicate minerals?) and how the gold occurs (e.g. does the gold occur as coarse grains or is it finely disseminated?).

2) How and where gold occurs cannot, in general, be assumed *a priori*. Even among deposits of similar type within a single mining camp, local gold distributions almost always must be established through some sort of sampling survey.

3) When assaying for gold, failure to use statistically acceptable sampling and sample preparation procedures may result in non-representative assay data which could produce misleading reserve estimates, in the case of an advanced exploration project, or, for a less advanced project, could result in a decision to not proceed with further target evaluation when in fact additional work was justified.

4) When the necessary information required to establish statistically acceptable sampling methods for a given target is lacking, a reasonable manner in which to approach the sampling problem would be to assume a worst case scenario and sample accordingly. In the case of gold, this situation might arise when all gold in an auriferous zone is assumed to occur in the native state as "coarse" grains (nuggets).

   Consider as a possible worst case situation (for sampling) an otherwise attractive gold deposit with an average grade of 0.20 ounce gold per ton (6.857 g/t gold) which contains uniformly distributed 1 mg grains of gold. If the gold grains are assumed to be cubes, each grain would measure 0.37 mm on a side; these would pass through a 40-mesh Tyler screen. Each tonne of auriferous material will contain, on average, 6857 1 mg grains of gold. Assume that during the course of an exploration program a 1000 g sample of the mineralized material is obtained and is subsequently submitted to a laboratory for assaying. Although on average each 1000 g sample will contain 6.857 grains of gold, it can be shown that about 30 percent of the 1000 g samples will contain five or fewer gold grains and that about 47 percent of the samples will contain six or fewer gold grains.

5) Conventional laboratory sample preparation for a "standard" fire assay for gold typically involves a) crushing the submitted sample to minus 6 mesh, b) taking a split subsample from this, which is subsequently pulverized, and c) fire assaying a 5 to 30 g subsample of the pulverized material. The result of the assay is typically reported on an 'ounce of gold per ton' or a 'gram of gold per tonne' (g/t=ppm) basis.

   Let us assume that the above mentioned 1000 g auriferous sample is assayed using the standard fire assay procedure. Assume furthermore, that the entire sample is pulverized (which, in fact, is usually not the case) and finally that the pulverizing process does not reduce the size of the contained gold grains (also a worst case, but reasonable, scenario). Then the assaying procedure in about 47 percent of cases amounts to attempting to characterize a 1000 g sample which contains six or fewer gold grains, by using a 30 g, or less, subsample.

   Intuitively, the above "standard" procedure appears to be a less than satisfactory method of evaluating nearly half of all 1000 g samples obtained from the hypothetical auriferous zone. In fact, the likelihood of a 30 g subsample containing no gold grains, when taken from a 1000 g sample which contains six gold grains, is about 83 percent.

6) An alternative means of gold assaying is known as the "pulp and metallic" method. The procedure typically entails a) crushing a sample to minus 6 mesh, b) taking a split sample for pulverizing (often a 400 g sample is pulverized; however, some laboratories pulverize the entire submitted sample), c) passing the entire pulverized (sub)sample through a screen (typically, either an 80-, 100- or 150-mesh screen is used), d) weighing the sample fraction which did not pass through the screen (the 'plus' fraction) and fire assaying this in its entirety, and e) weighing the sample which passed through the screen (the 'minus' fraction) and fire assaying two (typically 15 g) subsamples. The three fire assay results are reported, as are the weights of the plus and minus fractions. This information allows an overall sample assay to be calculated, and, indicates, additionally, the proportion of the gold which is present as a "metallic" (coarse-grained) component.

   In the above example, performing a pulp and metallic gold assay that included the pulverizing of the entire 1000 g sample would virtually assure that if gold were present in the sample, it would be detected by the analyst. If only a 400 g split of the sample were pulverized, the method still offers a vast improvement over conventional fire assay methods.

   In addition to allowing the geologist (engineer) to place greater confidence in his assay data, the pulp and metallic method also serves to establish whether a significant coarse gold component is present in the sample. It therefore constitutes a type of pilot survey, which will aid in determining how best to sample the mineralization in the future.

   Pulp and metallic gold assays are performed routinely in the industry by commercial laboratories, at a cost of about $30 per sample (this compares with a cost of about $10 per sample for a standard gold fire assay). Put into the context of a surface diamond-drilling program, if an exploration hole intersected potential gold mineralization which warranted 20 samples to be taken along the length of the core, the cost differential between having pulp and metallic fire assays run, as opposed to "standard" fire assays (about $20 per sample), would amount to about $400. Assuming $20 per foot as an average diamond-drilling cost, the added expense for "aggressive" assaying, designed to avoid the possibility of missing a worst case, but nevertheless attractive and potentially economic target is comparable to having drilled an additional 20 feet (on a per hole basis).

7) When assaying for gold, especially during preliminary phases of exploration, and always when coarse gold is known (or suspected) to be present, it is of prime importance for representative sampling, that samples contain "large" numbers of discrete gold particles. Tilsley Associates (1984) recommend that acceptable results may be expected when samples contain more than 10 gold particles. Any sampling procedure which reduces the number of gold particles in an assayed subsample below 10 (such as core splitting performed prior to submitting a sample to a laboratory, or sample splitting performed within the laboratory) will therefore decrease the degree to which the assay is representative of the entire sample. Consequently, explorationists should consider submitting whole (as apposed to split) diamond-drill core samples for assay, subsequent to the detailed logging and photographing of those sections.

The goal of the majority of exploration diamond drilling is to intersect an orebody. Whether or not a drillhole is likely to have achieved this goal is reflected in the assay values which the hole generates. It is the responsibility of the explorationist to ensure that if gold is present in a sample, its presence is reflected by assay data. As scientifically distasteful as the above recommendation to assay complete (as opposed to split) core sections may appear to many, this procedure probably represents the best and most cost effective method of evaluating the gold content of core samples during the initial drilling phase of exploration programs.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

PRECAMBRIAN GEOLOGY SECTION

R.M. Junilla mapped Doon and Yarrow Townships southwest of Matachewan.

D.J. Good began a study of the Platinum Group Element potential of selected intrusions within the Abitibi Belt.

D.G. Troop continued studying alteration and petrochemistry in the vicinity of the Ross Mine, Hislop Township.

GEOPHYSICS–GEOCHEMISTRY SECTION

K.G. Steele and C.L. Baker continued a reconnaissance till sampling program during the winters of 1987 and 1988, in order to gain access via winter roads to areas inaccessable during the summer. Bedrock and till core samples obtained from the rotasonic drilling is available for viewing at the Kirkland Lake and Timmins Drill Core Libraries.

V.K. Gupta conducted a gravity survey in the Iroquois Falls–Lake Abitibi area.

RESEARCH BY OTHER AGENCIES

University of Ottawa

K. Hattori, and K. Hicks

Magmatic–Hydrothermal Activity and Wall–Rock Alteration at the Lake Shore Mine, Kirkland Lake.

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12. Cobalt Resident Geologist's Area—1987

L. Owsiacki[1] and D.P. Anderson[2]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Cobalt

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Cobalt

INTRODUCTION

After five years of falling prices, most commodities bottomed out in 1987 and began following an upward trend. This rebound, together with the continuing attraction of flow-through share funding, resulted in the biggest exploration and development boom in this area in the past decade. Production of all commodities mined also rose significantly during the year.

Some of the more important developments to take place in 1987 included the completion of the new Penna headframe at the Langis Mine; completion of Agnico-Eagle Mines Limited's new Penn silver mill; the announced production plans for the Hellens-Eplett Mine; and construction of a mill and tailings settling area at this mine.

A long-standing land claim by the Temagami Indian Band has restricted claim staking over much of the Resident Geologist's Area for the past decade. This has resulted in very much reduced exploration activity.

A new proposal to create an extensive wilderness reserve between Gowganda and Temagami has received increasing attention by the Public and Government. If followed through, creation of this reserve would remove a large tract of unexplored and potentially valuable mining land from future exploration and development.

The many research projects initiated in the past few years are continuing and several new projects are nearing completion. They are described in more detail in the following sections.

These projects are aimed at expanding the local economic base and providing new data to assist in finding and developing new commodities, and at expanding our knowledge of the geology and ore forming processes in the camp.

RESIDENT GEOLOGIST'S ACTIVITIES

During the year, the Cobalt office was staffed by Resident Geologist, Leo Owsiacki; Secretary, K. Larabie; Contract Geologists, P. Anderson and M.C. Smyk; Tourism Project Supervisor and Draftsman, L. Francis; Experience '87 students, K. Frackleton and J. Evans; Futures Clerk/Typist, L. Ludwig; and Manual Labourer, W. Pollard.

In March, Mining Division and Resident Geologist boundaries were changed across the province. The Cobalt Resident's area was subsequently divided between the Larder Lake and Sudbury Mining Divisions. The Cobalt area was expanded to include 61 additional townships and now consists of 141 townships or approximately 14 000 km^2. However, much of this new area remains within the boundaries of the Temagami Indian land claim which prevents staking and prospecting of claims. Only 43 percent of the Resident's area is now open to claim staking. Files were transferred from Kirkland Lake and Sudbury and reorganized to conform with the filing system used in Cobalt. Office staff are preparing to sell claim tags and issue prospector's licenses by February of 1988.

In January of 1987, the one-shot Municipal Hazard Abatement Program was established by the government. The purpose of the program was to provide funds to certain mining Municipalities to be applied toward safeguarding any potentially hazardous mine workings previously identified within defined areas. This office played a continuing role in liaising between various municipalities, companies, and Ministries, and providing technical expertise during the life of the program. In addition, work on the various review committees greatly assisted the municipalities of Haileybury, Cobalt, and Coleman Township in obtaining funding to carry out a total of 101 projects. A total of $797 155 was expended during the year on these projects and all were completed by the end of August.

In June of 1987, a portion of Highway 11B caved-in at the approach to the town of Cobalt. Office staff spent much time in the ensuing four months assisting the Town, mining company, consultants, and various Ministries in resolving the many problems encountered. This assistance ranged from initial technical direction, including drill supervision; interpretation of maps and further definition of hazards; liaising with various Ministries; participating on numerous planning committees; providing office services for consultants; inspecting further related reported hazards; and acting as an information source for the Ministry.

Office staff continued to assist the Ministry of Natural Resources in a program of identifying, inspecting, and prioritizing old mine hazards in the Cobalt, Elk Lake, and Gowganda areas. Potential hazards were reported in five locations in the Cobalt area. Three of the sites were not considered hazardous; one was highlighted for future remedial action and one remote site was flagged by a member of the public using the area. In Elk Lake, two properties were visited in James Township and one in Farr Township, and in the Gowganda area, three properties in Milner Township were inspected. Remedial action carried out by the Ontario Ministry of Natural Resources, Swastika, was funded by a Canada-Ontario Unemployment Insurance Section 38 Job Creation Program grant and consisted of capping shafts and filling holes. Assessment file research on other properties is ongoing and will identify hazards for future action.

The compilation and publication of Geological Data Inventory Folios was continued during the year under the auspices of the Canada-Ontario Mineral Development Agreement (COMDA). Twelve folios were completed and published in 1987. In the past four and one half years, GDIFs for 71 townships have been published, representing 89 percent of the old Cobalt Resident Geologist's area. With the expansion of boundaries during the year to include an addi-

TABLE 12.1 MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES.

Ontario Geological Survey Reports

Open File Reports

OFR 5593
OFR 5631
OFR 5642
OFR 5644
OFR 5645
OFR 5646
OFR 5651
OFR 5655
OFR 5656
OFR 5661
OFR 5665
OFR 5675

Preliminary Maps - Geological Series

P.3073
P.3074
P.3101

Preliminary Maps - Data Series

GDIF 375
GDIF 376
GDIF 377
GDIF 424
GDIF 426
GDIF 427

Aggregate Resources Publications

Federal - Provincial Maps

OFM 92
OFM 93
OFM 104

Coloured Maps

Map 2518

Northern Ontario Engineering Geology Terrain Studies Reports

Northern Ontario Engineering Terrain Studies Maps

Mineral Resources Branch Publications

MPBP 23
MPBP 24

Miscellaneous Reports

MP 77
MP 124
MP 134
MP 136
MP 137

Geological Survey of Canada Open File Reports

MR 213
MDC 26
Map 900A
Map 1642A
Map 1644A
Map 1693A

tional 61 townships, completion of coverage has been delayed until the end of 1989.

Technical assistance and consultative services were provided to prospectors, industry representatives, geologists, government, and the general public as a means of encouraging and facilitating effective exploration and development in the area. Eleven field trips were conducted by office staff for university, high school, public school, industry, and government representatives. These trips are important in introducing new companies to the exploration potential of the area and in educating those not familiar with the local geology. In addition, lectures and field trips were provided for the Ministry of Natural Resources' Briggs Junior Ranger camp.

The Cobalt Miner's Festival was reactivated this year after a two year hiatus and took place between July 30 and August 2, 1987. Office staff manned a display which included public education posters from the Ministry, maps detailing local exploration and research projects, and silver samples loaned by Agnico-Eagle Mines Limited and Hellens-Eplett Mining Incorporated. This is the first time that this office has participated in the Miner's Festival and the response was very positive.

The Resident Geologist was primarily occupied during the year with administration, management, and the completion of three projects started in 1986. In addition to dealing with over 700 office visits by mining representatives and a similar number of phone and written inquiries, a number of property visits were carried out, and mapping of Banting and part of Best Township was continued. Much time was spent this year participating on a wide range of Ministry committees dealing with information management, publications and communications, mineral resources, and mine hazards, in addition to normal staff, technical, and work-planning meetings.

Use of the facilites and services provided by the Resident Geologist's Office increased to record levels as over 715 individuals passed through the doors. This is a 36 percent increase over 1986 and surpasses the previous record of 573 set in 1984.

Additional programs being carried out by office staff include the following.

GEOLOGY AND MINERAL POTENTIAL OF BANTING TOWNSHIP AND THE WESTERN PART OF BEST TOWNSHIP, NIPISSING DISTRICT

During the 1987 field season, detailed mapping was continued in Banting Township and the western part of adjacent Best Township. M.C. Smyk initiated a detailed evaluation of known and new mineral occurrences discovered in this area as part of a COMDA-funded project. This project is a continuation and extension of a study initiated by L. Owsiacki in the McLean Lake-Lundy Lake area between 1983 and 1985 (Owsiacki 1984).

ECONOMIC EVALUATION OF THE LAKE TIMISKAMING PALEOZOIC OUTLIER

A project initiated in 1985 to evaluate the economic potential of limestones and dolostones comprising the Lake Timiskaming Paleozoic Outlier has been concluded. An Open File Report describing the project and the results of field work has since been released (Grant and Owsiacki 1987). Numerous companies were present to view the results and exploration is now being planned for a number of the areas identified as having high potential for limestone or dolostone.

MINING AND TOURISM PROJECT

The Heritage Silver Trail is a self-guided tour designed to illustrate, through example, the historical impact of Cobalt's mining past. The tour is meant to be educational, informative, and picturesque, and consists of five major sites. Each site has a viewing area, picnic table, and parking area. Throughout the tour, signs have been strategically placed to describe historical and geological features and generally inform the public of the pertinent aspects at that site. In all, six site signs, thirteen descriptive signs, five billboards, and numerous smaller directional signs guide the tourist through the trail.

During the spring of 1987, construction of the sites was completed and a sixth billboard was designed and erected for travellers approaching the area from the north. A coloured brochure was designed and printed and 6000 copies were distributed to tourist booths, service stations etc. within a 150 km radius. In early June, an official opening was organized and management of the trail was handed over to Northern Ontario's Cobalt Mining Museum. The opening was well attended and marked the beginning of an extremely successful inaugural summer. In the four-month period from mid-May to mid-September, over 14 000 tourists from around the world passed through the sites, making this the third best attended tourist draw in the north for the year.

DRILL CORE LIBRARY

In 1987, 3306 m of core were collected from seven companies and stored. In excess of 9000 m of core, obtained previously from townships formerly in the Kirkland Lake Resident's area, remains in storage in that town. The Cobalt facility was expanded to include a final set of core racks which hold an additional 6100 m of core. Existing core was rearranged, moved into the newer section of the building, and standard labels applied to each core box. Core obtained from drilling undertaken as part of the previously described Limestone Study was split and is now available for viewing by the public at the core library. Use of the building increased during the year as over seven individuals reexamined core from various properties. The library was also used by Golder Associates to store core obtained during extensive test drilling related to the Cobalt cave-in.

MINING ACTIVITY

Prices for most commodities mined in this area finally bottomed out in late 1986, after a five year downtrend. Silver increased in price by 33 percent from last year, to $7.03 (U.S.) per ounce (at the time of writing), having passed through a peak of $11.25 (U.S.) in late April. Metal production, severely depressed last year because of the destruction of Agnico-Eagle Mines Limited's silver mill, bounced back significantly with the completion of a new mill in June, 1987. With an extensive backlog of stockpiled ore, this company will continue to produce significant volumes of silver, at least to the end of 1988, from all three of its area silver mines.

A production decision was finally announced for the Hellens-Eplett Mining Incorporated (formerly the Silverside Resources Incorporated) silver property in Lorrain Township. However, problems with obtaining various permits has delayed mining and milling until the start of 1988. Development continued throughout much of the year and included the addition of a ventilation raise which is now being converted to a production shaft. In addition, a tailings holding area was built nearby and construction of a small on-site mill was begun.

Underground exploration and development projects increased from four last year to over six this year, in addition to two significant small open pit bulk sampling programs carried out on a gold and kyanite deposit. One silver mine, the Langis Mine of Agnico-Eagle Mines Limited, returned to production status after a year of exploration. In addition, a new shaft, with headframe, was collared on the Langis Mine property; a new portal was collared in Cobalt by the same company as the precursor to a major underground exploration program planned to start in 1988; the Tyranite headframe and shaft is being rehabilitated and a new ramp driven in advance of a major underground gold exploration and evaluation program; and a project to rehabilitate the old Keeley-Frontier Silver Mine in South Lorrain Township, in 1988, was announced. With the expansion of the Cobalt Resident Geologist's Area, a single producing silver mine, the Castle, was added to this report area.

Quarrying by Dymond Clay Products Limited continued to expand and reached peak production, with current markets, this year. However, with the release of a Government study designed to identify further potential areas of limestone and dolostone (Grant and Owsiacki 1987), and a potential market of an additional 100 000 t per year of dolomite for the local iron mines, much potential for expansion still exists. The company is also investigating the possibility of entering the lime market.

Operations at the Dofasco-owned Sherman Iron Mine have been relatively stable over the past six years. The mine was once again closed for a five-week period during the summer. However, production of iron pellets increased for the second consecutive year and a new flux pellet process, developed last year, was successfully put into full operation.

Three mills are located within the Cobalt area but only one operated during 1987. A fourth, portable mill is nearing completion at the Hellens-Eplett Mine. The Penn Mill (Agnico-Eagle Mines Limited) was completly rebuilt after a fire destroyed much of the old mill in early 1986. The new mill cost approximately $3 million to build and went into operation on July 1, 1987. Since this time, it has operated at about 80 percent of the design capacity of 300 tons per day and is still in the tune-up stage. All ore put through the facility during the year was obtained from the Langis, Castle, and Beaver-Temiskaming Mines.

The Agnico-Eagle Mines Limited Refinery also renewed operations with the onset of milling in July.

In addition to processing ore from the company's mill, various research-oriented work was undertaken at the plant. A Northern Ontario Regional Economic Development Program (NORDEV) grant was obtained to assist in funding research into the feasibility of developing alternate extraction and refining processes. The initial work was carried out for the company by Hydrochem Developments Limited and further work will also be undertaken at the refinery in 1988. The staff also investigated the potential for treating the Nipissing Tailings, situated near the Town of Cobalt, and completed a variety of small projects intended to reduce the environmental impact of effluent prior to expected tightening of Ontario Ministry of Environment regulations, expected next year.

Some work was also carried out to improve silver recoveries from the argentite-rich Langis ores.

In 1986, XIB Resources was formed and obtained a grant to assist in refurbishing parts of the old Cobalt Refinery. Most of this work has now been completed and two different metal extraction pilot plant operations were tested in 1987. The primary process resulted in extraction of 60 000 pounds of copper from impregnated sludge and liquids by either electroplating or cementation with an iron powder. In addition, 1000 ounces of silver were recovered from used X-ray film obtained from the local Temiskaming Hospital. Research is also progressing into other extraction processes which could result in other elements being recovered from various secondary sources.

Mineral commodities mined and paid for during the year increased significantly from last year as silver production was renewed by the camps largest primary producer. Approximately 560 000 ounces of silver were produced from three area mines. This amount is still far below levels attained in the period between 1980 and 1985, but processing was only carried out in the second half of the year. Production levels are predicted to increase significantly in 1988, as both the mill and refinery are planned to operate continuously for the year. A marked decline is also predicted for 1989, as reserves decline in the three presently producing mines.

Iron pellet production increased by five percent to 1 087 120 t and limestone production increased by 18 percent from the previous year to 152 549 t. In addition, 27 t of copper and 1000 ounces of silver were recovered from secondary feedstocks at the Cobalt Refinery. Quarrying of decorative building stone increased to approximately 300 tons. Substantial quantities of sand and gravel were also extracted. Cobalt, copper, and nickel were mined together with silver but not recovered. The estimated total gross value of minerals extracted in the area, during 1987, increased by 30 percent from last year to over $56 million.

LANGIS MINE (AGNICO-EAGLE MINES LIMITED)

Mining was renewed in December 1986, and continued throughout 1987, without interruption. All work was conducted in areas accessed from the old No.6 shaft workings. The only development to take place during the year was minor and involved stope preparation prior to mining. Extensive underground diamond drilling continued, primarily to test an area discovered in late 1985, southeast of the present workings. Some fill-in drilling over known ore veins was also completed. Total footage drilled increased for the second consecutive year, by seven percent to 8495 m. Exploration and mining will probably continue in the No.3 and No.6 shaft workings until the end of 1988 when the new Penna shaft is scheduled to be completed.

Approximately 9548 tons of ore containing 149 077 ounces of silver was mined during the year from four veins located in the No.6 shaft workings. Forty-five percent of the ore originated from the No.110 vein, above the 400-foot level. Although this vein has now been mined out, broken ore still remains to be pulled. Thirty percent of the ore was mined from the No.112 vein, above the 400-foot level. This vein is now completely mined out. The remaining ore originated from the No.53N and No.53S veins above the 335-foot level. Reserves still remain in the No.53N and No.54 veins where mining has just been initiated.

The most significant development during the year was the collaring of the new Penna shaft, located approximately 1.5 km east of the Langis No.3 shaft. Construction was started in May 1987, and has almost been completed. This is turning out to be one of the most modern mines to be built in this area in some time. An office-dry complex is almost complete and a hoistroom-compressor building is finished. A new headframe, purported to be the tallest ever in the camp, has been completed and a three-compartment cement shaft collared to a depth of 10 m in bedrock. Shaft sinking is scheduled to begin in January 1988 and will be completed to a depth of 366 m by the end of June. Crosscutting and development on two levels should be completed by the end of 1988, and exploration of the potential ore zone started by this time. As a precursor to this development, the company expanded its land holdings in the area to approximately 2300 acres and purchased a controlling interest in the Langis Silver and Cobalt Mining Company Limited.

The new shaft has been put down near the centre of a paleodepression in the underlying Precambrian Keewatin volcanic terrain. The depression is infilled with a thick sequence of Huronian-age Coleman Member sediments which are intruded by a Nipissing diabase sill. The bottom part of this sill forms the upper rock unit in this area. Significant high-grade silver intersections have been recovered from within all three rock types at the western margin of this trough. The best assay to date is 50 ounces over 9.45 m, intersected in the volcanic rocks. A second good intersection was obtained from veins cutting a massive sulphide unit located nearby.

CASTLE MINE (AGNICO-EAGLE MINES LIMITED)

Mining continued throughout the year at this property located in Haultain Township. However, production decreased markedly from a 1986 level of 12 436 tons to approximately 5203 tons. The amount of silver recovered declined from 240 567 ounces in 1986, to approximately 61 937 ounces in 1987. These figures reflect the rapid decline in reserves at this mine and signal the imminent closure of the mine. Unless new veins are discovered in the near future, ore will be exhausted by the summer of 1988. The company is now finalizing negotiations to lease the adjoining Peerless Group of claims and intends to rehabilitate the existing Coleroy shaft and headframe in order to carry out a major exploration program in 1988.

Underground exploration during the year consisted of extensive diamond drilling totalling 7290 m. The majority of this drilling was within the Nipissing diabase above the sixth level. Minor drilling also investigated the lower contact with Keewatin volcanic rocks on the tenth level. Development was relatively minor and consisted of 183 m of drifting and crosscutting, 63 m of subdrifting, and 150 m of raising.

Seventy-five percent of the ore mined during the year originated almost equally from three principle veins, the No.23, No.1905, and No.0101N. The No.23 vein was mined between the fourth and second levels and is now completely mined out. The No.0101N was mined above the sixth level in 1986 and ore removed this year represents broken muck remaining from the 1986 work. The No.1905 vein was mined above the third level and has also been mined out. The remaining ore originated from three minor veins which were also mined out.

BEAVER-TEMISKAMING MINE (AGNICO-EAGLE MINES LIMITED)

Silver mining, exploration, and development continued throughout the year at a pace similar to that of 1986. Thirty-six percent of the ore pulled during the year and 47 percent of the silver was obtained from the No.41 and No.44 vein stopes. These two veins were actually mined out in early 1986, and this material represents the last of the broken ore. The No.37 vein provided 27 percent of the ore mined and 30 percent of the silver. The remaining ore was obtained, in decreasing order of importance, from the No.56, No.53, No.38, No.51, and No.61 veins. All mining took place above the 1330-foot level. Total production increased from last year by 55 percent to 14 322 tons, yielding 248 737 ounces of silver for an average grade of 17.4 ounces silver per ton. Reserves have been steadily declining over the past few years and sufficient ore remains for approximately seven more months of mining. Although exploration has been continuing at a high rate over the past few years, no major new ore veins have been discovered.

Once again, no development work was undertaken in the main, south mine workings during the year. In the Brady Lake area to the northwest, presently accessed from the 1600-foot level, 100 m of crosscutting was completed on the 1320-foot sublevel to provide drill access. In addition, a new crosscut was started this year on the 1330-foot level and has been extended a distance of 366 m to the northwest from the Temiskaming shaft. Drilling is now underway at this location to test an earlier intersected vein structure. The crosscut will ultimately extend another 525 m to access the No.63 vein, defined in earlier development in the Brady Lake area. Potential presently exists for the development of at least one stope on this vein structure. Drill holes are also being extended from this location, for a distance of 610 m, to explore the western property boundary for any new vein structures.

Underground exploration diamond drilling declined for the third consecutive year, by three percent, to 6642 m. All of the drilling was carried out in the Brady Lake area and although numerous veins with minor cobalt and silver values were intersected, no significant intersections were made. At present, limited reserves have been identified and exploration will continue in this area at high levels, to expand these reserves.

All stopes have been developed in veins cutting Archean mafic volcanic flows below a significant, step-like structure formed at the lower contact of a Nipissing diabase sill (Robinson 1984). During the year, most of the ore was obtained from those parts of the veins cutting the mafic volcanic rocks, although ore does persist up into the diabase, in some instances to 15 m. The prime area of exploration today (Brady Lake) differs in some ways from the south part of the mine in that veins often occur closely related to a wide band of black, cherty interflow sediment.

SHERMAN MINE (DOFASCO INCORPORATED AND TETAPAGA MINING COMPANY LIMITED)

For the sixth consecutive year, this relatively low-grade iron mine was shut down for a five-week period. Production levels increased for the second consecutive year by five percent to 1 087 120 t of iron pellets, recovered from 3 780 000 t of crude ore. At the same time, mining of waste increased by two percent to 2 690 000 t. The mine has maintained production in excess of 1 000 000 t of pellets despite a reduction in the work force to 363 employees from a level of 473 ten years ago. At current mining rates, sufficient ore remains to last at least until 1995.

A fourth pit was put into production during the year and is now contributing a growing proportion of the ore mined. As a result, production from the main East Pit declined to 47 percent of the total and ore extracted from the West Pit declined marginally to 29 percent of the total. The slack was taken up by the development of the Turtle Lake Pit which contributed 18 percent of the ore in 1987. Production from the South Pit, which is primarily a scavenging operation using backhoes, dropped to five percent of the mine total.

During 1987, mining of the East Pit was extended down to the third bench. At the South Pit, the eastern part was mined out and mining of the western portion was initiated. The first bench was started at the western margin of the new Turtle Lake Pit.

Besides the start-up of the Turtle Lake Pit, the main development at the mine was the addition of a new grinding mill, at an estimated cost of $1.5 million, dedicated specifically to flux processing. The company also plans to begin experimenting with the use of waste carbon as another potential additive to the pellets.

BUCKE QUARRY (DYMOND CLAY PRODUCTS LIMITED)

This quarry operation attained peak production this year, for the markets presently developed. Although actual quarrying takes place only during the eight-month period from April to November, operations at the plant now continue year round. There are presently five permanent staff, and from 15 to 30 contract employees working during the year. Production increased by 18 percent from 128 668 t in 1986, to approximately 152 549 t this year. Of this total, 82 percent (92% in 1986) was sold to the Sherman and Adams Iron Mines as flux limestone, five percent (six percent in 1986) was metallurgical limestone sold to the Kidd Creek smelter, less than one percent (one percent in 1986) was agricultural limestone and 13 percent (one percent in 1986) was sold as aggregate and armourstone. Potential for diversifying into other markets in the future remains high.

Exploration on the property during the year consisted of drilling seven vertical holes to extend the potential ore horizon laterally for pit development plans. The pit itself has increased significantly in dimensions and now measures about 200 m by 100 m by 7 m deep. The most significant development at the quarry site in 1987, involved construction of a new high elevation storage bin which, combined with the previously built domed storage building, creates a complete crushing, drying, and loading facility.

MAJOR DEVELOPMENTS AND ADVANCED UNDERGROUND EXPLORATION PROJECTS

HELLENS-EPLETT MINE (HELLENS-EPLETT MINING INCORPORATED)

Development at this silver property, located in Bucke and Lorrain Townships, continued to progress toward a production stage (Owsiacki 1987). Extensive underground exploration diamond drilling was undertaken to expand known vein systems and discover new veins. Drifting and raising on the five known veins was continued. The most significant developments during the year included the completion of a 100 m ventilation raise to surface; conversion of this raise to a production shaft; extending an exploration crosscut 200 m west to the McKenzie Fault on the 502-foot level; further bulk sampling of the No.1 Vein; construction of a mill building and offices; and construction of tailings settling ponds. Both the mill and tailings area will be completed by year-end and production is slated to begin early in 1988. To this point, approximately $5 million dollars have been spent on this property.

Underground exploration diamond drilling continued at a modest rate but declined by 31 percent from 8045 m in 1986, to 5574 m in 1987. Drifting, crosscutting, and raising, however, continued to increase as a production decision nears. No significant new veins were discovered during the year and exploration is currently focussed on an area west of the McKenzie Fault.

The mine will be relatively small, with the production hoist capable of skipping approximately 30 tons per hour. The hoist has been installed and the first test loads skipped successfully in early December. The mill building has been erected and 60 percent of the equipment is on-site. The mill will consist of both a gravity and flotation circuit and will have the capacity to process 80 tons of ore per day. An adjacent tailings enclosure is nearing completion and will consist of a two-level settling pond arrangement. Concentrate will be custom refined at the local Agnico-Eagle Refinery.

TYRANITE MINE (TYRANEX GOLD INCORPORATED, GUNNAR GOLD INCORPORATED, MILL CITY GOLD INCORPORATED)

The Tyranite Mine, a gold producer from 1939 to 1941, has been reactivated by Gunnar Gold Incorporated and Mill City Gold Incorporated. The companies are carrying out considerable exploratory work to gain a 50 percent interest in the property. Line cutting, geological mapping, geochemical and geophysical surveys, including magnetic, VLF, and induced polarization, have been completed. Follow-up powerstripping by Norwin Resources Limited has since identified three potential gold zones.

Several intrusions of peridotite, now altered to serpentinite, have resulted in carbonitization and silicification of contacts, creating favourable zones for mineralization. A diamond-drill program is now testing these zones. Early reports suggest geological reserves of about 526 000 tons grading 0.2 ounce gold per ton in the South Lens orebody. Initial results from the Duggan Zone and the North Lens Zone are also encouraging. Work is now progressing on renovating the original shaft to continue exploration of these zones underground. Construction of several permanent buildings, including a core building, assay office, dry, mill, offices, hoist, and gate house is also continuing. In early December 1987, a new decline was started and will be used to explore the Duggan Zone, which should be intersected at a vertical depth of 46 to 53 m.

TYRANITE TAILINGS PROJECT (TYRANEX GOLD INCORPORATED AND MILL CITY GOLD INCORPORATED)

Mill City Gold Incorporated and joint venture partner Tyranex Gold Incorporated initiated a project to reclaim gold from tailings at the Tyranite Mine, near Gowganda. From 1939 to 1942, the mine produced 223 810 tons of ore with a recovered grade of 0.147 ounce gold per ton. Feasibility studies carried out by the companies indicate that the tailings grade 0.034 ounce gold per ton, and that the gold is evenly distributed throughout the coarse fractions from three tailings ponds. A small gravity-separation tailings mill with six slime tables was erected during the summer. A recovery rate of 65 percent was expected from a throughput of 7540 tons per day. Test runs of 2000 tons of slurry were carried out during the summer to identify any further requirements for the system.

DUNCAN GOLD MINE (DUNCAN GOLD RESOURCES INCORPORATED)

This company mined a 7000-ton bulk sample from an open pit beside the old Minto Shaft, in Tyrrell Township. The ore zone occurs in a brecciated rhyolite pipe averaging 18.3 m in diameter and extends down to a depth of at least 366 m. The brecciated zone is surrounded by a quartz-carbonate alteration ring. Gold is carried in pyrite grains and cubes occurring within the brecciated rhyolite, but can also occur in free form within the quartz-carbonate zone. The ore was shipped to Timmins and no further work is planned until it is milled.

MANN MINE (MANRIDGE EXPLORATIONS LIMITED)

This company recently dewatered underground workings at the D-Zone Property, in Milner Township. A decline was sunk in 1984, and silver ore mined from one stope. The company is now awaiting flow-through-share funds to carry out an extensive underground exploration program in 1988. Plans are to deepen the decline to a create a lower level, and test known vein structures with raising, lateral development, and diamond drilling. The workings and veins at this location are entirely within Nipissing diabase.

UPPER BONSALL MINE (SANDY K MINES LIMITED)

Sandy K Mines Limited recently contracted Derry, Michener, Booth & Wahl to manage an underground exploration program at the Upper Bonsall Mine Property in Nicol Township. The company has refurbished an existing adit at the Lower Bonsall Mine site which is being used to provide drill stations. Over 6096 m of drilling is planned to investigate the surrounding rocks for silver vein mineralization. The adit will be extended to intersect the contact between Keewatin volcanic rocks and a Nipissing diabase sill which was discovered by surface drilling in 1965. Further crosscutting will explore the contact area. Site clearing has been completed and office facilities have been put in place.

CONISIL MINE (NOVAMIN RESOURCES INCORPORATED AND CANACORD RESOURCES INCORPORATED)

Novamin Resources Incorporated regained full control of their Cobalt area properties late in 1986, when an option agreement with Canadaka Mining Corporation was terminated. At this time, a new agreement was reached with Canacord Resources Incorporated to finance an underground exploration program at the formerly producing Conisil Silver Mine. This company can earn a 30 percent interest in Novamin's area properties by expending $3 million. During the summer, Breakwater Resources Incorporated acquired Novamin Resources Incorporated and made it a wholly-owned subsidiary.

In January, the companies started an underground program of drifting, crosscutting, and raising to test previously identified drill intersections and extensions of mined out veins. All exploration has been confined to the 310-foot and 535-foot levels of the mine. Exploration diamond drilling totalled 2173 m and was concentrated on the 535-foot level on three veins. Extensions of existing drifts and crosscuts and some raising totalled 1096 m on the 535-foot level and 292 m on the 310-foot level.

The bulk of exploration has been concentrated on extending the No.2 and No.78 veins both laterally and vertically, up to the 310-foot level and above. In this particular area, much of the ore originated from carbonate veins cutting an overlying Nipissing diabase sill. At this time, all efforts are focused on defining ore within Nipissing diabase in the No.2 and No.78 veins, above the 310-foot level. Raises are currently being extended upward from the 535-foot level along the No.78 vein at regular intervals. Numerous zones of high-grade ore have been identified to date and good potential exists for expanding ore reserves. Significant new reserves have been defined during this project, which will conclude at the end of February 1988.

SLATE CREEK DECLINE (AGNICO-EAGLE MINES LIMITED)

Underground exploration diamond drilling at the former Teledyne Decline, located in Bucke Township, continued during the year. Three known vein systems were tested for extensions by long, flat holes and extensive fan drilling was completed to investigate a Huronian sedimentary horizon sandwiched between Keewatin volcanic rocks and an overlying Nipissing diabase sill. Although the veins were extended, both silver and cobalt values were too low to be of economic interest. Numerous new minor vein structures carrying cobalt and silver were also encountered, but contained similarly low grades. As a result, the project was terminated at the end of August and the pumps removed. Some surface drilling may be undertaken in the spring to test other parts of the property.

PETERSON LAKE DECLINE (AGNICO-EAGLE MINES LIMITED AND SILVER CENTURY EXPLORATIONS)

Agnico-Eagle Mines Limited, together with Silver Century Explorations Limited (now controlled by Agnico-Eagle Mines Limited) recently announced a joint $3.5 million exploration program for a large property located near the Town of Cobalt. The exploration is to be completed over a three-year period and will test a number of potential zones on the property. The initial phase involves the collaring of a new decline ramp on the western shore of Peterson Lake. The ramp will be driven next summer, below a Nipissing diabase sill, to allow exploration below.

PAN SILVER MINE (JASCAN RESOURCES INCORPORATED)

Dewatering of this mine was completed in December 1986, and an extensive underground exploration program initiated in January 1987, by A.C.A. Howe International Limited, the project managers. Numerous silver ore veins were previously discovered and developed by Pan Continental Mining (Canada) Limited, during exploration and mining undertaken in 1981 and 1982. The present work initially concentrated on extending many of these veins, using a combination of drifting, raising, and diamond drilling. In addition, exploration diamond drilling of previously untested areas of the mine was undertaken and resulted in the discovery of a number of new silver-arsenide veins.

There are presently three active working levels at the mine. Development on the 190-foot level was restricted to the extreme south mine workings and included 248 m of drifting and crosscutting and 63 m of raising. This work resulted in the discovery of two new silver veins, No.28 and No.29, and the extension of the previously known No.24 vein. A new ore shoot was discovered during this latter work along the No.24 vein, but high-grade silver in the other new veins proved to be erratic (poddy) on this level.

A total of 336 m of drifting and crosscutting and 31 m of raising were completed on the 240-foot level. Following test drilling, crosscuts were extended to the southeast, below veins No.24 and No.27, to test for the down-dip extensions. Drifting along the No.24 vein revealed the presence of two ore-grade shoots of silver, and drifting along the No.27 and No.28 veins intersected several similar but smaller shoots.

On the 290-foot level, down-dip extensions of the nortn vein system were investigated with diamond drilling. Encouraging results may prompt additional drifting along these veins. In addition, the main No.1 vein was tested below this level for the first time. It was found to continue as a strong structure 7 m down, but carried negligible silver. The bulk of work on this level involved driving a long exploration crosscut from the southern limits of the workings to gain access to the Curry Claim. The crosscut extended 580 m and intersected four silver-arsenide veins. One of these veins, the No.31, was drifted along for 18 m; the remaining three have yet to be investigated. Drills have recently been set-up at the end of the crosscut and are fanning out to probe the surrounding rocks. The company has established inferred geological reserves and will continue exploration to at least the end of February 1988.

BUTLER KYANITE (KYANITE MINING CORPORATION)

Kyanite Mining Corporation completed stripping of a one and a half acre zone over an orebody containing 20 percent kyanite, in Antoine Township near Crocan Lake. A 500-ton bulk sample and future metallurgical testing will determine the viability of this deposit.

KEELEY MINE (SUNMIST ENERGY INCORPORATED)

A 14-claim group in South Lorrain Township, including the formerly producing Keeley and Frontier Silver Mines, was purchased during the year from M & M Porcupine Gold Mines Limited. Sunmist Mining and Energy Incorporated have since hired Derry, Michener, Booth & Wahl to oversee an initial $750 000. exploration program on the property. The company plans to rehabilitate the Keeley headframe and pump out the workings, prior to carrying out an extensive underground diamond-drill program from the 12th level down to a depth of 610 m. Work is scheduled to begin early in 1988 and is dependant on securing financing.

EXPLORATION ACTIVITY

A marked increase in commodity prices, particularily for gold, silver, and base metals, and the attractiveness of flow-through financing resulted in a dramatic increase in exploration in the Cobalt Resident Geologists's Area in 1987. All exploration and development indicators reached record high levels for this decade. Total underground and surface exploration diamond drilling increased by over 87 percent in 1987, after a 61 percent increase in 1986. At this time, over 78 770 m of core have been drilled. Surface drilling increased by 105 percent to 34 865 m, and underground drilling increased by 75 percent to 43 906 m (Figure 12.2). Flow-through funding, strong commodity prices, an expansion of area boundaries, and increased exploration are responsible for this increase.

Claim staking activity reflected this renewed interest and increased by 161 percent from last year, to the highest levels recorded in the past decade. This is significant, particularly with the continuing effects of the Temagami Indian Band land-claim.

For the first time this decade, the majority of exploration focussed on gold, although much activity was still apparent in silver, base metals, platinum, and diamond exploration. Major exploration and development undertaken during the year is summarized below and in Table 12.2.

COBALT AREA

J. Armstrong added six claims, in Bucke and Coleman Townships, to a four-claim group explored last year. The property was subsequently transferred to Armsher Resources Incorporated which carried out another diamond-drill program to follow up an encouraging 25 cm section of massive sulphide intersected in the Huronian sediments during last years' drilling. The current exploration continued to investigate the ground over the inferred extension of the No.64 fault, a structure which carried high-grade silver to the east. Six holes were put down (965.3 m) and although a strong, vein and shear zone was intersected, no significant silver was encountered. As with previous holes, very good copper, lead, and zinc values were obtained. The drilling is continuing.

Falconbridge Limited staked a large claim block in Bucke Township in the Spring and completed negotiations with a number of farmers to option adjoining patented claims. The claims are situated in a part of the camp containing few previously recorded mineral occurrences and little evidence of past exploration. They straddle a major regional structural feature called the Cross Lake Fault. The company is currently cutting a grid over the property and plan follow up geophysical surveys and diamond drilling. It is most likely that silver and/or gold are the commodities being sought.

Lac Minerals Limited staked four claims in Bucke Township which had previously been explored by Monopros Limited for kimberlites. The company has initiated a deep drill program to evaluate a kimberlite pipe for its diamond potential. Four and a half inch core is being used and will probably be bulk sampled.

One hole is now down to a vertical depth of almost 900 feet and a second is proposed.

Silvern Resources Limited staked a large group of claims in Bucke Township and carried out a line cutting program during the summer. A geophysical survey is planned for the winter. The claims straddle the Cross Lake Fault and were probably acquired because of the Falconbridge Limited activity immediately to the northwest.

Novamin Resources Incorporated and Canacord Resources Incorporated carried out a surface drilling program near the Cleopatra shaft in Coleman Township, in an effort to confirm the presence of a high-grade silver vein identified in old reports. The drilling did not intersect any significant mineralization and plans to rehabilitate the underground workings were abandoned. Twelve holes were drilled for a total length of 691 m.

Winteroad Resources Limited recently acquired a 26-claim group in South Lorrain Township, west of the formerly producing Keeley-Frontier Silver Mine. The company contracted Derry, Michener, Booth & Wahl to carry out a diamond-drill program. Two holes totalling 932 m were subsequently put down on the former Veinlode Property in October 1987. A number of quartz-carbonate veins carrying minor galena and chalcopyrite were intersected.

Pronto Explorations Limited and Seal River Explorations Limited carried out an extensive magnetic and VLF survey on a 34-claim group in Casey Township. This work was followed up in the spring with a major drilling program totalling 3048 m. The ground is situated north of a new silver zone discovered earlier by Agnico-Eagle Mines Limited. Minor silver values were intersected and anomalous gold values were found in veins cutting a nearby syenitic intrusion.

Silver Bar Mines Limited completed minor stripping and trenching on a quartz vein cutting Nipissing diabase in Bucke Township. Interesting gold values were obtained from grab samples last year. Other companies affiliated with R.A. Gilson also staked a few claims to the north of this property, adjoining a large group staked earlier by Falconbridge Limited. The company is also talking of bringing a portable mill to the Silver Queen Property in Coleman Township and processing silver ore mined from there in 1984 (Owsiacki 1985).

Agnico-Eagle Mines Limited completed a modest surface exploration program in the vicinity of the Langis Mine in Harris Township. Four holes were drilled near the new Penna shaft to define the extent and location of a paleotrough occurring in the Keewatin basement.

I. MacDonald and D. Brydges acquired two claims near the southwest corner of Clear Lake in Coleman Township in 1987. They found a number of old shafts put down in the past on graphitic interflow sediments and narrow carbonate veins. A single diamond-drill hole is currently being extended to test for potential structures related to an inferred fault zone, and extensions of the interflow sediment bands.

D. Paquette staked two blocks of claims in Bucke Township and carried out a detailed prospecting and sampling program. No significant mineralization was discovered and most of the claims were subsequently dropped.

K.A. Morgan completed a magnetic survey on claims held in Lundy Township. The survey served to more accurately define boundaries between buried rock formations but did not reveal any correlations with the many copper and cobalt occurrences on the claims.

R. Butler carried out minor stripping and trenching of fractures in Nipissing diabase in Dymond Township. The area was previously optioned and drilled by Agnico-Eagle Mines Limited (Owsiacki 1987).

ENGLEHART AREA

The Hudson Bay Exploration and Development Company Limited carried out exploration on seven claims located in Bryce Township, near Heather Lake. The claims are underlain by intermediate and felsic breccias and tuffs of the Abitibi Belt, which are intruded by quartz-feldspar porphyries, gabbro, and diabase. Previous work on the claims identified veins with gold values over narrow widths. The company completed an overburden sampling program of 34 holes and identified an anomalous mineral train. Stripping and trenching were subsequently carried out during the latter part of the year. Further follow-up work has been recommended.

Gossan Resources Limited recently completed a joint venture agreement with Quillo Resources Incorporated to explore a 32-claim gold property in Bryce Township. The claims adjoin a property to the west, which is being explored by the Hudson Bay Exploration and Development Company Limited. Line cutting was completed and a geophysical program subsequently undertaken.

Resources Halex Incorporated carried out exploration, on 12 claims in Dack Township, which consisted of line cutting, geological mapping, a magnetic survey, and diamond drilling. The property is underlain predominantly by mafic volcanic flows. A major shear, defined by quartz veining within a green mica carbonate zone, cuts across the claims. An old shaft was previously put down to a depth of 13.7 m on this zone, to test surface gold showings. Previous drilling suggested that gold occurred in a zone measuring 68.6 m by 7.6 m by 1.5 m wide, in this area. This company drilled one hole near the shaft to confirm values recorded in the previous work. One intersection returned an assay of 0.10 ounce gold per ton.

McAdam Resources Incorporated drilled four holes (660 m) to test a magnetic anomaly in Bryce Township in December 1986. Several promising quartz veins were intersected in oxide-silicate facies iron formation hosted by mafic flows, but no significant gold values were obtained.

SHINING TREE AREA

Chesbar Resources Incorporated completed line cutting on a four-claim group in MacMurchy Township prior to initiating a geophysical program and follow-up diamond drilling. The claim group, commonly known as the Caswell or Westree Property, contains two old shafts and numerous veins. Intermittent exploration between 1911 and 1939, included trenching, diamond drilling, shaft sinking, drifting, and sampling, which defined erratic gold values from quartz-carbonate veins containing visible gold.

Greater Temagami Mines Limited carried out considerable exploration on the ten-claim Triton Group option (includes the Kingston Mine and Shiningtree

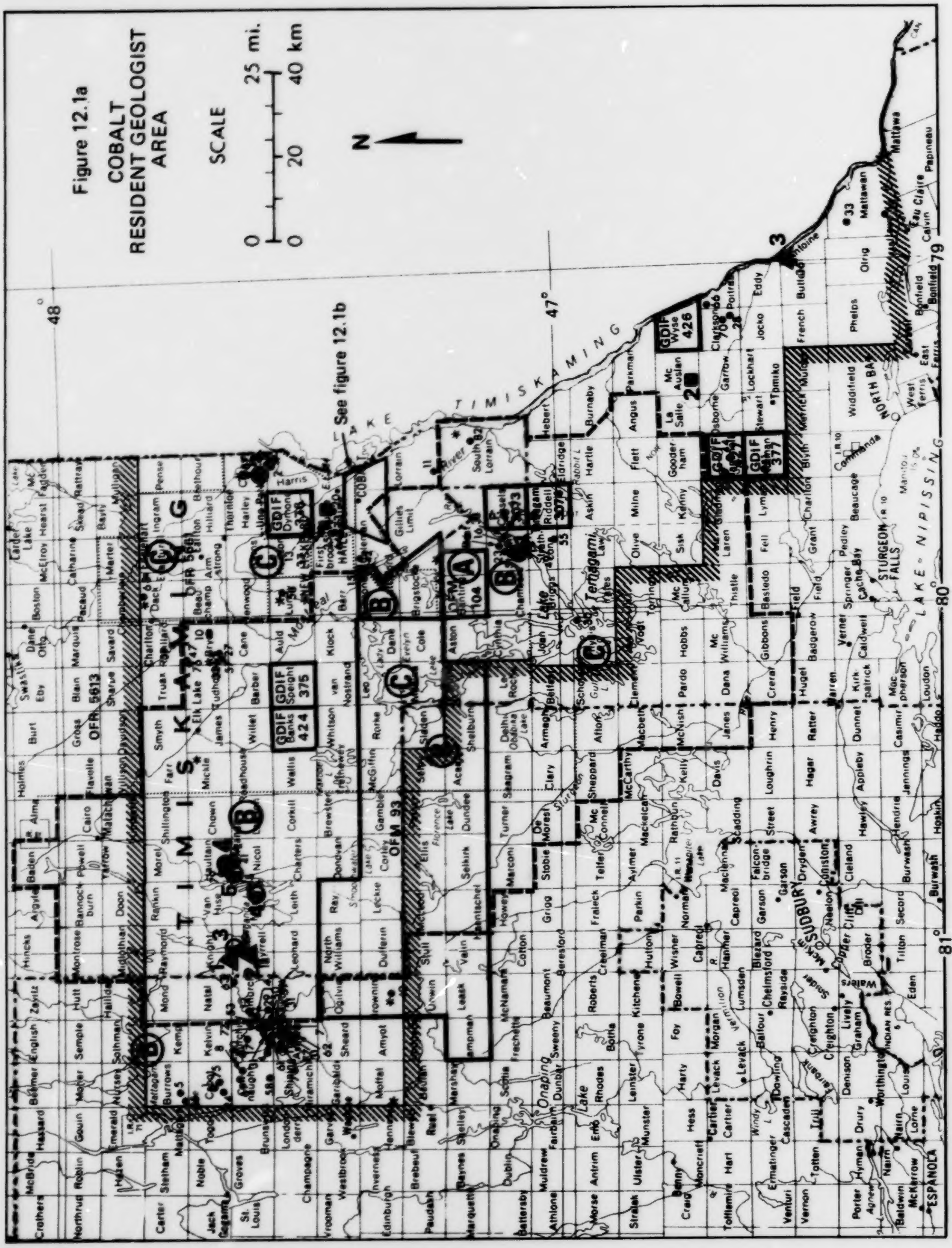

Figure 12.1a
COBALT
RESIDENT GEOLOGIST
AREA

SCALE
0 20 25 mi.
0 20 40 km
N
48°
47°
81°
80°
79°
LAKE TIMISKAMING
LAKE NIPISSING
See figure 12.1b
T I M I S K A M I N G
SUDBURY
NORTH BAY
STURGEON FALLS
ESPANOLA
Temagami
Mattawa
GDIF Banks 424
GDIF Speight 375
GDIF Dymond 376
GDIF Wyse 426
GDIF Riddell 379
GDIF Chisholm 377
OFM 93
OFM 104
OFR 5613
OFR 5681
A
B
C

EXPLANATION

● Producing Mines, 1987
  1. Sherman Mine (Dofasco, Tetapaga Mining Co. Ltd.) .... Fe
  2. Beaver-Temiskaming Mine (Agnico-Eagle Mines Ltd.) .... Ag
  3. Langis Mine (Agnico-Eagle Mines Ltd.) .... Ag
  4. Castle Mine (Agnico-Eagle Mines Ltd.) .... Ag

◐ Mines Under Development, 1987
  1. Hellens-Eplett Mine (Hellens-Eplett Mining Inc.) .... Ag

Mines Undergoing Exploration, 1987
  1. Pan Silver Mine (Jascan Resources Inc.) .... Ag
  2. Conisil Mine (Novamin Resources Inc./Canacord Resources Inc.) .... Ag
  3. Tyranite Mine (Tyranex Gold Inc./Gunnar Gold Inc./Mill City Gold Inc.) .... Au
  4. Mann Mine (Manridge Explorations Ltd.) .... Ag
  5. Upper Bonsall Mine (Sandy K Mine Ltd.) .... Ag
  6. Slate Creek Decline (Agnico-Eagle Mines Ltd.) .... Ag
  7. Peterson Lake Decline (Agnico-Eagle Mines Ltd.) .... Ag

▲ Properties Under Evaluation, 1987
  1. Tyranite Tailings Project (Tyranex Gold Inc./Mill City Gold Inc.) .... Au
  2. Duncan Gold Mine (Duncan Gold Resources Inc.) .... Au
  3. Butler Kyanite (Kyanite Mining Corp.) .... Ky

⊕ Mines Currently Maintained on Stand-by Basis
  1. University Mine (Novamin Resources Inc./Canacord Resources Inc.) .... Ag
  2. Cleopatra Mine (Novamin Resources Inc./Canacord Resources Inc.) .... Ag

■ Producing Quarries
  1. Dymond Clay Products Ltd. .... limestone
  2. McLaren's Bay Mica Stone Quarries .... stone

⦶ Operating Mills
  Penn Mill (Agnico-Eagle Mines Ltd.)

◉ Operating Refineries
  1. Agnico-Eagle Refinery (Agnico-Eagle Mines Ltd.)
  2. Cobalt Refinery (XIB Resources)

• Exploration and Claim Staking Activity in 1987 (keyed to TABLE 00)

* Assessment Work Filed in 1987

Ⓐ Location of Resident Geologist's Field Mapping Parties in 1987

Ⓑ Location of Ontario Geological Survey Field Mapping Parties in 1987

Ⓒ Location of Geological Survey of Canada Field Mapping Parties in 1987

▬ Map or Report Issued by the Ontario Geological Survey in 1987

········· Open File Report Issued by the Ontario Geological Survey in 1987

----- Areas Withdrawn from Staking through Bear Island Indian Caution

//// Boundary of Resident Geologist's District

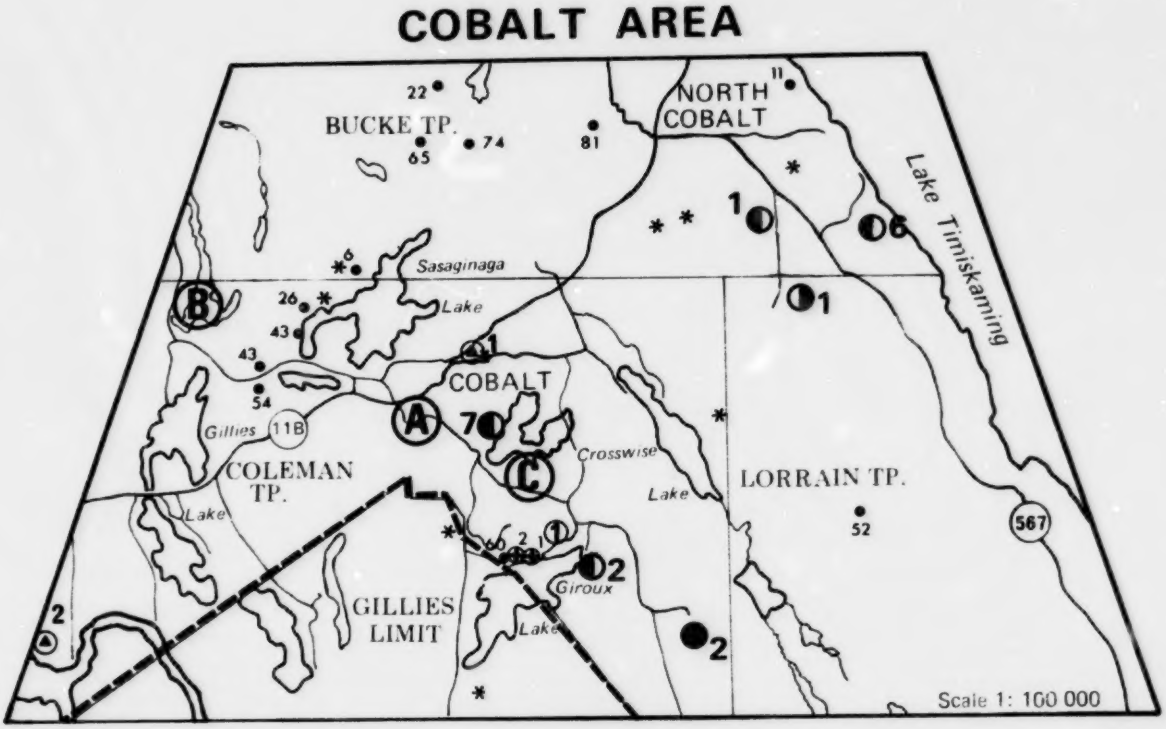

Figure 12.1b COBALT AREA

Gold Mine) in MacMurchy Township. Ongoing exploration at the old Shiningtree Gold Mine consisted of stripping, cleaning out of old trenches, sampling, and diamond drilling four holes. A 9 m wide, 15 m deep open pit, put down to test a shear zone, now provides access to the shaft and workings of the original mine. Samples from the muck pile, mined out in recent years, commonly contain visible gold. Earlier in 1987, the company completed magnetic, VLF, and resistivity surveys at the Kingston Mine, in addition to drilling six exploratory holes. At this location, a vertically dipping shear, discovered in 1919, was found to contain gold, pyrite, sphalerite, galena, and pyrrhotite in a quartz gangue. Two shafts were sunk in 1939 to explore this vein.

Teck Explorations Limited recently acquired 45 claims in Asquith Township, immediately west of the Town of Shining Tree. Stripping was completed on a single claim within the 15-claim William Sullivan Option. Several promising gold veins were reported on the property which was explored with an inclined exploration shaft in 1914. In 1973, Vintage Mines Limited completed geological mapping, electromagnetic surveys, and diamond drilling on this property. Further exploration will be undertaken by Teck following freeze-up.

Asquith Resources Incorporated recently optioned the Holding, Buckingham, and Kubiak Properties and include them among 63 claims held in Asquith Township. The company also holds a single adjoining claim in MacMurchy Township. The Holding Property includes three exploration shafts as well as a number of trenched quartz veins. Considerable exploration work has been performed on the Buckingham claim group since 1918, when a 55.5 m inclined shaft was sunk. Both surface and underground diamond drilling, together with geological mapping, was also completed at this time. Pitting, trenching, sampling of quartz veins, and geological mapping was carried out on the Kubiak property sporadically between 1919 and 1936 (Carter 1979).

Asquith Resources Incorporated recently completed line cutting, geophysical surveys, geological mapping, and stripping on these properties. Diamond drilling is scheduled to begin in December, 1987. The company also holds 23 claims in Connaught Township where some magnetic and VLF work was completed in 1987. Exploration on this ground will be continued this winter and will concentrate on a strong, graphitic shear zone carrying good gold values.

Onitap Resources Incorporated was active, in 1987, on two separate properties in the Shining Tree area. On the Gosselin claim group, located in Asquith and Churchill Townships, 16 holes (2387 m) were drilled along a significant alteration zone. Previous drilling in this area outlined a low-grade gold zone containing approximately 100 000 tons of material grading 0.04 ounce gold per ton. The best assay from this zone was 0.15 ounce gold per ton over a 1.52 m

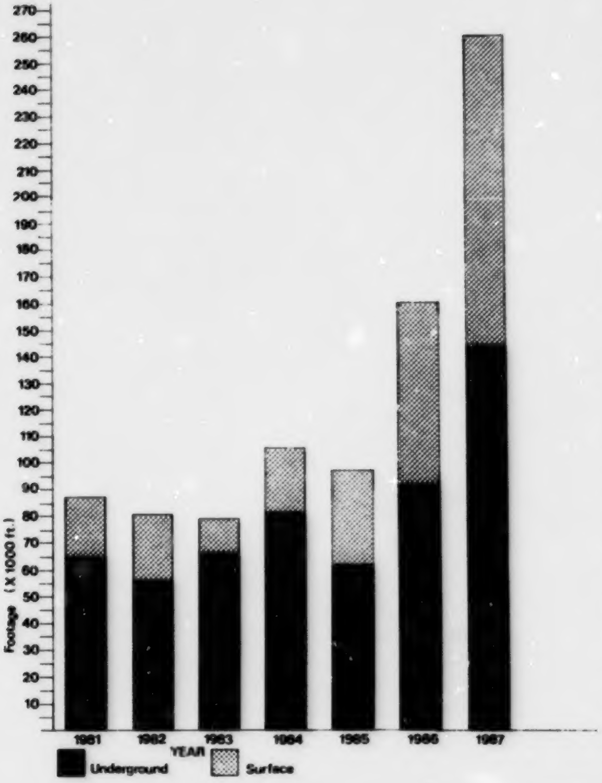

Figure 12.2. Exploration diamond drilling activity in the Cobalt Resident Geologist's Area.

width. A high-grade vein was also discovered on another part of this claim group in 1984. It was stripped, trenched, and sampled this year, with the best samples returning assays of 0.30, 0.31, and 1.07 ounce gold per ton. In the Frith Lake area, several old pits were cleaned, and additional trenching carried out, along the Gosselin Vein. This vein, which contained the first gold discovered in the Shining Tree gold camp, was found in 1911. At this time, a 15.2 m shaft was sunk on the vein and intensive prospecting carried out. Since that time, numerous companies have explored this area.

The company also carried out exploration on the Jesse James claim group, located west of Shining Tree. An area coinciding with a soil geochemical gold anomaly was stripped, trenched, and drill tested with a single 305 m hole. The nearby Jesse James vein yielded its original owner Ed "Jesse" James good profits from pockets of high-grade gold. However, as in other quartz veins typical of this camp, the visible gold was erratically concentrated. A number of companies are now investigating abundant pyrite mineralization found within iron formation, carbonate zones, and quartz veins for potential gold in this general area.

R. Annett and R. Ferguson (Nealand Mining Exploration Limited) drilled two holes this year, on a property straddling Asquith, Churchill, and Connaught Townships. The first hole explored a quartz-carbonate shear zone in the north part of Asquith Township, near West Shiningtree Lake, while the second hole was drilled through carbonates in the Jonson Lake area. Some stripping accompanied the drilling in these areas.

Argentex Resource Exploration Corporation acquired 62 claims in Burrows Township during the year. Geological mapping, humus geochemical sampling, and 1200 m of diamond drilling (ten holes) were completed in October and November, 1987. Further work will depend on the results of this work.

Orcana Resources Limited completed 12 miles of line cutting in MacMurchy Township and followed this up with magnetic and VLF surveys, geological mapping, sampling, and 1585 m (13 holes) of drilling. Gold, pyrite, pyrrhotite, and arsenopyrite were found to occur within a carbonitized shear zone containing quartz stringers. A diabase or diorite dike at the south contact of the shear was also found to be intensely altered and veined by a network of quartz stringers.

Shiningtree Resources Incorporated acquired part of the former Shiningtree Gold Resources holdings in Churchill Township. The company completed surveying the claims in October, in order to bring the property to lease. Further exploration is planned for 1988, to fully explore two, known, high-grade gold veins and a gold-bearing iron formation located on the property. The Gold Corona Vein is a shear-type quartz vein in which the gold is associated with quartz and pyrite in iron formation. In the past, exploration on this vein included trenching, channel sampling, diamond drilling, and shaft sinking. A second high grade vein, the Cochrane, consists of banded oxide-facies iron formation with disseminated patches of pyrite, carrying gold. The iron formation throughout the property is interlayered with felsic and intermediate metavolcanics (Carter 1980). Extensive stripping was carried out on this vein by Shiningtree Gold Resources Incorporated several years ago. The company also built a small mill on the property.

Exploration by Dome Exploration (Canada) Limited was hampered during the year by logging operations on their Tyrrell Township property. Previously cut lines were destroyed by the logging and had to be resurveyed. Seven holes, totalling 1223 m were, however, completed during the year, to test scattered gold values occurring along a contact between a porphyry dike and Archean volcanic rocks.

C.W. Brunet continued stripping on claims hosting a vein-type copper occurrence in MacMurchy Township. Chalcopyrite, bornite, and specularite are found in a quartz-carbonate vein in brecciated red rhyolite. Work was stopped when claim posts and lines were destroyed by lumbering activities on the property.

C. Gunter completed a small program of stripping, blasting, and trenching on quartz-carbonate veins exposed on three separate claim groups in Churchill and Asquith Townships. The best gold assays returned values ranging from 2.0 to 2.5 ounces per ton in grab samples originating from claims in Churchill Township.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 12.2

Number on Figure	Individual or Company	Activity
1	Actuate Resources Limited	Claim staking (25), Cabot Township
2	Agnico-Eagle Mines Limited	Surface diamond drilling, shaft sinking, geophysical survey, Harris Township
3	Agnico-Eagle Mines Limited	Surface diamond drilling, Haultain and Nicol Townships
4	Annett, R. and Ferguson, R. (Nealand Mining Exploration Limited)	Claim staking (61), surface diamond drilling, Asquith, Churchill and Connaught Townships
5	Argentex Resource Exploration Corporation	Claim staking (68), geological mapping, geochemical sampling, surface diamond drilling, Burrows Township
6	Armsher Resources Incorporated	Claim staking (6), surface diamond drilling, Coleman and Bucke Townships
7	Asquith Resources Incorporated	Claim staking (13), line-cutting, geophysical surveys, geological mapping, stripping, Asquith and Fawcett Townships
8	Asquith Resources Incorporated	Geophysical surveys, Connaught Township
9	Bateman, J.	Claim staking (2), Bucke Township
10	Becker, J.	Claim staking (4), Bryce Township
11	Bishop, B.A.	Claim staking (4), Bucke and Lorrain Townships
12	Brunet, C.W.	Stripping, MacMurchy Township
13	Butler, R.	Stripping, trenching, Dymond Township
14	Chesbar Resources Incorporated	Line-cutting, geophysical survey, surface diamond drilling, MacMurchy Township
15	Chitaroni, G.P.	Claim staking (3), Coleman Township
16	Cominco Limited	Surface diamond drilling, Strathy Township
17	Deering, D.	Claim staking (11), Churchill Township
18	Dome Exploration (Canada) Limited	Surveying, surface diamond drilling, Tyrrell Township
19	Duncan Gold Resources Incorporated	Bulk sampling, Tyrrell Township
20	Dymond Clay Products Limited	Surface diamond drilling, Bucke Township
21	Falconbridge Limited	Claim staking (31), line-cutting, Hammell and Lyman Townships
22	Falconbridge Limited (Kidd Creek Mines Limited)	Claim staking (33), line-cutting, Bucke Township
23	Fleck Resources Limited	Line-cutting, surface diamond drilling, Strathy Township
24	Fournier, G.	Claim staking (30), Cabot Township
25	Gilson, S.A.	Claim staking (6), Bucke Township
26	Gore, J.A.	Claim staking (3), Coleman Township
27	Gossan Resources Limited and Quillo Resources Incorporated	Line-cutting, geophysical survey, Bryce Township
28	Grainger, J.F.	Claim staking (4), Clarkson Township
29	Greater Temagami Mines Limited	Stripping, trenching, sampling, surface diamond drilling, geophysical surveys, MacMurchy Township
30	Greater Temagami Mines Limited	Sampling, line-cutting, geochemical survey, airborne geophysical survey, Joan and Phyllis Townships

TABLE 12.2 Continued

Number on Figure	Individual or Company	Activity
31	Gunter, C.	Claim staking (8), stripping, trenching, Asquith and Churchill Townships
32	Hudson Bay Exploration and Development Company Limited	Overburden sampling, stripping, trenching, Bryce Township
33	Hudson Bay Mining and Smelting Limited (Mingold Resources Incorporated)	Overburden drilling, Mattawan Township
34	Janveaux, J.M.	Claim staking (3), Mattawan Township
35	Kirwin, T.	Claim staking (9), Burrows Township
36	Kyanite Mining Corporation	Stripping, Antoine Township
37	Lac Minerals Limited	Claim staking (4), surface diamond drilling, Bucke Township
38	Lacana Mining Corporation Limited and Stroud Resources Limited	Surface diamond drilling, Strathy Township
39	Lacasse, D.R.	Claim staking (23), Robillard Township
40	Lauzon, R.	Trenching, pitting, Browning Township
41	Lencourt Limited	Vibracore drilling, Nicol Township
42	Leslie, B.	Claim staking (1), Coleman Township
43	Link, T.	Claim staking (8), Coleman Township
44	Mackie, W.M.	Claim staking (2), Hammell Township
45	Manridge Explorations Limited	Stripping, diamond drilling, Milner Township
46	Manridge Explorations Limited	Stripping, trenching, surface diamond drilling, Strathy Township
47	McAdam Resources Incorporated	Surface diamond drilling, Bryce Township
48	McAdam Resources Incorporated	Line-cutting, Cassels Township
49	McAdam Resources Incorporated	Line-cutting, geophysical survey, Strathy Township
50	McBride, G.	Claim staking (1), Churchill Township
51	McClemens, A.	Claim staking (4), Notman Township
52	McCullough, E.W.	Claim staking (2), Lorrain Township
53	McDiarmid, D.	Claim staking ([illegible]), Churchill Township
54	McDonald, I.	Claim staking (2), surface diamond drilling, Coleman Township
55	Monopros Limited	Overburden sampling, Strathcona Township
56	Morgan, K.A.	Geophysical survey, Lundy Township
57	Morris, J.A.	Claim staking (17), Bryce Township
58	Nelson, H.T.	Claim staking (42), Connaught Township
59	Norwin Resources Limited	Claim staking (40), Churchill and Asquith Townships
60	Novamin Resources Incorporated and Canacord Resources Incorporated	Surface diamond drilling, Coleman Township
61	Onitap Resources Incorporated	Claim staking (4), surface diamond drilling, stripping, trenching, Asquith and Churchill Townships
62	Onitap Resources Incorporated	Stripping, trenching, surface diamond drilling, Asquith Township
63	Orcana Resources Limited	Line-cutting, geophysical surveys, geological mapping, sampling, surface diamond drilling, MacMurchy Township

TABLE 12.2 Continued

Number on Figure	Individual or Company	Activity
64	Outcrop Explorations Limited	Claim staking (4), Bucke Township
65	Paquette, D.	Prospecting, sampling, Bucke Township
66	Pharand, C. and Pharand, P.	Claim staking (8), Poitras Township
67	Pronto Explorations Limited and Seal River Explorations Limited	Geophysical surveys, surface diamond drilling, Casey Township
68	Ressources Halex Incorporated	Line-cutting, geological mapping, geophysical survey, surface diamond drilling, Dack Township
69	Salo, L.	Claim staking (37), Connaught Township
70	Saville, T.	Claim staking (4), Clarkson Township
71	Sherman Mine (Dofasco Incorporated and Tetapaga Mining Company Limited)	Sampling, Strathy Township
72	Shiningtree Resources Incorporated	Surveying, Churchill Township
73	Silver Bar Mines Limited	Stripping, trenching, Bucke Township
74	Silvern Resources Limited	Line-cutting, Bucke Township
75	St.Jean, G.	Claim staking (20), Cabot Township
76	Stockill, K.J.	Claim staking (9), Bryce Township
77	Sullivan, W.J.	Claim staking (1), stripping, Asquith Township
78	Teck Explorations Limited	Claim staking (29), Asquith Township
79	Tyranex Gold Incorporated, Mill City Gold Incorporated and Gunner Gold Incorporated	Line-cutting, geological mapping, geochemical and geophysical surveys, power stripping, surface diamond drilling, Tyrrell and Knight Townships
80	Vellow, P.E.	Claim staking (3), Churchill Township
81	Whipple, I.G.	Claim staking (5), Bucke Township
82	Winteroad Resources Limited	Surface diamond drilling, South Lorrain Township

R. Lauzon completed trenching and pitting on one claim in Browning Township.

GOWGANDA-ELK LAKE AREA

A surface diamond-drill program, comprising 16 556 m (22 holes) was undertaken by Agnico-Eagle Mines Limited to explore areas near Everett Lake and Kirkpatrick Lake in Haultain Township, and Miller Lake in Nicol Township. The Everett Lake holes were drilled to the south in an effort to intersect veins drilled from the tenth level of the Castle Mine. Results were not encouraging.

Manridge Explorations Limited recently renewed exploration at their Mann Mine silver property in Milner Township. At this time, 550 m of surface drilling has been completed.

Lencourt Limited (formerly Canadian Lencourt Mines Limited), reached an agreement with Sandy K Mines Limited to acquire the Sandy K royalty interest in the Siscoe Mill silver tailings retreatment project in Gowganda. Vibracore drilling, undertaken as part of a feasibility study, outlined 1 800 000 tons of tailings with an average grade of 1.42 ounces silver per ton. The operation is planned to initially produce 350 000 ounces of silver annually, with a planned lifespan of seven years. Recoveries of 87 percent are expected from a simple operation involving grinding, cyanide leaching, zinc precipitation, and refining.

TEMAGAMI AREA

Exploration in the Temagami Greenstone Belt continued to increase markedly after dramatically rising in 1986. The number of active companies increased from three in 1986, to eight in 1987. Commodities sought also expanded from gold to include platinum and diamonds.

The Sherman Mine initiated a minor gold exploration program on their mine property in Strathy Township. Encouraged by a talk presented on the Emerald Lake Gold Mine, hosted by similar rocks to the west, the company decided to sample all tailings for gold. In addition, a new program of sampling for gold in cuttings from the last hole drilled for each blast in the four production pits was initiated.

Monopros Limited carried out a follow-up surface till sampling program in the southern part of Strathcona Township. The company was investigating kimberlite indicator anomalies identified in earlier reconnaissance sampling programs.

Lacana Mining Corporation Limited and Stroud Resources Limited continued a major diamond-drill program on their property in Strathy Township, following encouraging results from earlier drilling (Owsiacki 1987). A new program was undertaken in March and April, 1987, to test down-dip extensions below the 152 m level of the main vein zone. The drilling to this point proved that the mineralized zones did continue below this level, although, at this location, gold values were not as good as intersected higher up in the earlier drilling. The company has just completed another drill program in this area totalling 6400 m (50 holes) and plans to continue drilling in January 1988. The drilling just completed served to further expand reserves at the main vein zone, and trace the mineralized horizon further along strike. In addition, some holes were drilled at a second gold occurrence located to the southwest, and intersected encouraging values for the first time.

Fleck Resources Limited recently optioned the formerly producing Kanichee Mine from one of P. Sheridan's companies. Although the mine was primarily a copper producer, both nickel and platinum-palladium occurred in interesting quantities. The company initiated an exploration program for platinum and has completed cutting a new grid on the property. The initial phase of this exploration involves surface diamond drilling. Three holes, totalling 472 m have been completed and two more are to be completed by year-end.

McAdam Resources Incorporated are investigating properties in both Strathy and Cassels Townships, for base and precious metals. The Milne Lumber Company sawmill and the Trans Canada Pipeline are on the five claims held in Strathy Township by the company. Line cutting and an induced polarization survey were completed in 1987, but the sawmill operations and pipeline caused too much background interference to get good readings. Further work will be carried out in the spring of 1988. In Cassels Township, linecutting was completed in preparation for a geophysical survey and diamond drilling.

Manridge Explorations Limited continued to explore a nine-claim group optioned last year in Strathy Township. Additional stripping and trenching was carried out on a single claim adjoining ground held by Inco Limited, to the east. A 13-hole drill program (approximately 1463 m) was also completed on this claim and tested the on-strike and down-dip continuity of high, but erratic, gold values obtained from the surface showings. Gold, associated with sulphides, occurs within a narrow shear zone cutting mafic volcanics and a complex, layered, mafic intrusive body. Boudined quartz-feldspar porphyry bodies are strung out along a broader deformation zone. Although good gold values were obtained in the drilling, the erratic nature of the mineralization continued. In addition to this work, the company also completed stripping and minor trenching on other claims in the group adjoining Net Lake.

Greater Temagami Mines Limited was formed during the year and acquired much of the Temagami area ground held by Keevil interests. Drill core from the formerly producing Temagami Copper Mine was relogged and sampled for gold and platinum during the summer. In addition, on the nearby mainland, line cutting and geochemical sampling were undertaken in the summer and a helicopter-borne magnetic-electromagnetic survey was flown over the central part of Lake Temagami.

Cominco Limited drilled six holes (1232 m) to test the Hermiston-McCauley gold property in Strathy Township in December, 1986. An old shaft is located on the claims and extensive previous work revealed the presence of two important veins. In the Main Vein, mineralization is chiefly pyrite with traces of copper. Surface sampling of a 20 m long shoot revealed gold values ranging from trace to 1.15 ounces gold per ton over 2.7 m. Mineralization in the Shaver Vein consists primarily of pyrite and galena. Ore reserves calculated on this vein, over a mining width of 0.91 m, yielded 8998 tons of 0.50 ounces gold per ton (Bennett 1978). No exploration has been carried out on this property since the 1940s.

NORTH BAY AREA

The level of exploration in this area remained relatively constant as a number of companies continued to actively explore for gold and base metals. Claim staking activity increased slightly and reflects the increasing interest in this part of the Grenville Province, that began a few years ago. Claims were staked in Hammell, Notman, Clarkson, and Mattawan Townships. In addition, building stone properties were actively pursued.

Hudson Bay Mining and Smelting (Mingold Resources Incorporated) holds a large claim block in Mattawan Township. The company carried out line cutting, geological mapping, a VLF survey, overburden sampling, and diamond drilling in 1986, to follow-up anomalous gold values obtained earlier from tills in a reconnaissance sampling program. In 1987, the company completed a short overburden drilling program consisting of 29 holes.

Falconbridge Limited staked a 59-claim group in Hammell and Lyman Townships earlier in the year. The company has since cut a large grid and plans a geophysical program once the lakes are frozen. The claims are well within the Central Grey Gneiss Belt of the Grenville Province. Exploration is being focussed on base metal potential, and possible gold and platinum associated with gabbros.

As described above in the major developments section, Kyanite Mining Corporation initiated a stripping and bulk sampling program on a kyanite deposit located in Butler and Antoine Townships, near Crocan Lake.

George Boughner quarried over 200 tons of building stone from his quarry in McAuslan Township during 1987. The stone is sold locally, in Toronto, and in the United States.

Numerous other companies expressed an interest in the Cobalt Resident Geologist's Area and include American Barrick Resources Corporation, Nortario Limestone Limited, Exploration Aiguebelle Incorporated, Aurobec Resources, Boston Creek Mines, Outcrop Explorations Limited, Esso Minerals Canada, Gilroy, Golden Shield Resources Limited, Golden Terrace Resources Corporation, Gold Fields Mining Corporation, Golder Associates, Jemco, Legacy Explorations Limited, Phantom Explorations, Shaft and Tunnel Engineering Services Limited, Quadra Consulting Group, Proteus Resources, St. Micheal Geoconseil, T.T.L. Minerals Limited, Mystery Mountain Mines Limited, Cobalt Power Company, and Tarmagon Construction Limited.

Prospecting activity remained at a high level despite the continuing effects of a land claim filed in the past by the Temagami Indian Band. A more complete summary of exploration activity in the Cobalt Resident Geologist's Area, in 1987, is provided in Table 12.2 and Figures 12.1 and 12.1a. Data donated or submitted for assessment purposes are summarized in Table 12.3 and relevant Ontario Geological Survey and Geological Survey of Canada publications are listed in Table 12.1.

TABLE 12.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY AND LARDER LAKE MINING DIVISIONS

SYMBOLS AND ABBREVIATIONS

Ag-Silver
AP-Aerial Photographs
Assess-Assessment Work
Au-Gold
BS-Benefication Studies
D-Donated by Company or Individual
DDH-Diamond Drill Hole Locations or Sections
DDS-Surface Diamond Drilling (where shown, the numbers following "DDS" indicate the number of holes drilled and the total length drilled respectively)
DDU-Underground Diamond Drilling (where shown, the numbers following "DDU" indicate the number of holes drilled and the total length drilled respectively)
EM-Electromagnetic Survey
Geochem-Geochemical Survey
Geophys-Geophysical Survey
GL-Geological Survey
Grad-Gradiometer Survey
IP-Induced Polarization Survey
Mag-Magnetometer Survey
OMEP-Ontario Mineral Exploration Program
Rpt-Property or Mine Report
rTr-Rock Trenching
SA-Sampling, Assays
STr-Stripping
UG Plans-Underground Plans
VLF-Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Asquith Twp.	41P/11	Gunter, C.A.	Au	Assess	STr, rTr	1987		
Asquith Twp.	41P/11	Sullivan, W.J.	Au	Assess	STr	1987		
Best & Brigstocke Twps.	31M/5	Benner, R.		D	AP			
Browning Twp.	41P/6	Lauzon, R.	?	Assess	rTr	1987		
Bryce Twp.	41P/9	Briscoe-Bryce Gold (Kapalua Gold Mines)	Au	Assess	Rpt, IP, VLF, Mag, Grad, SA, Geochem, GL	1984	63.4570	
Bryce Twp.	41P/9	Hudson Bay Exploration & Development Co. Ltd.	Au	Assess	Geochem	1987		
Bucke Twp.	31M/5	Benner, R.	Ag	D	AP			
Bucke Twp.	31M/5	Gilson, R.A.	Ag	Assess	DDS 1-209 ft, rTr	1986		
Bucke Twp.	31M/5	T.T.L. Minerals Ltd.	Ag	OMEP	GL, Rpt, SA	1984	63.4555	
Bucke & Coleman Twps.	31M/5	Armsher Resources Ltd.	Ag	Assess	DDS 3-2040 ft, DDH, GL	1987		
Casey Twp.	31M/12	Seal River Exploration Ltd.	Au, Ag	Assess	DDS 2-1732 ft	1987		
Churchill Twp.	41P/11	Ferguson, R. & Annett, R.	Au	Assess	DDS 1-125 ft, DDH	1987		
Churchill & Asquith Twps.	41P/11	Onitap Resources Inc.	Au, Ag	Assess	DDS 12-1036 ft, DDH	1987		
Coleman Twp.	31M/5	Aladdin Cobalt Mines	Ag	D	UG Plans	1920		
Coleman Twp.	31M/5	Phaeton Exploration Ltd.	Ag	OMEP	DDS 3-535 ft, Rpt, DDH	1985		
Coleman Twp.	31M/5	St. Joseph Explorations Ltd.	Ag	D	DDS 7-2281.5 ft	1973-74		
Dack Twp.	31M/13	Ressources Halex Inc.	Au	Assess	DDS 1-264 ft, DDH, Mag, GL, Rpt	1987	2.10516	
Dymond Twp.	31M/5	Agnico-Eagle Mines Ltd.	Ag	D	DDS 6-2518 ft, DDH, GL, Rpt, Mag, EM	1986		
Gillies Limit Twp.	31M/5	MacQuarrie, M.	Ag	D	DDS 1-103 ft	1966		
Gillies Limit Twp.	31M/5	Minacs, G.	Ag	D	DDS 3-886 ft	1968		
Harris & Casey Twps.	31M/12	Agnico-Eagle Mines Ltd.	Ag	D	DDH	1987		
Lundy Twp.	31M/12	Ferguson, B.	Ag	Assess	GL, Rpt	1986	2.9726	
Lundy Twp.	31M/12	Morgan, K.A.	Ag	Assess	Mag, VLF, Geophys	1986	2.9655 2.9671	
Mickle Twp.	41P/9	Teck Explorations Ltd.	Ag	OMEP	DDS 14-4995.3 ft, DDH	1984	63.4635	
Milner Twp.	41P/10	Manridge Explorations Ltd.	Ag	OMEP	DDS 15-3485 ft, DDU 28-3070 ft, DDH, Rpt, SA	1984		
Moffat, Garibaldi & Beulha Twps.	41P/6	Harlin Resources Ltd.	Au	Assess	BS	1986	2.9696	
South Lorrain Twp.	31M/4	Tinney, J.	Ag	Assess	Rpt	1980		

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

GEOPHYSICS–GEOCHEMISTRY SECTION

J.E. Hanneson continued a study in the Cobalt area utilizing electromagnetic surveys to trace Keewatin conductive sediments buried below thick deposits of Huronian sediments. During 1987, a large test grid was cut in the McLaren Lake area in Firstbrook and Coleman Townships, and surveys were completed. Results of these surveys will be correlated during the winter of 1987 and 1988.

PRECAMBRIAN GEOLOGY SECTION

P. Born and field assistants continued a multiyear program in the Temagami-Cobalt area, designed to evaluate the local mineral potential and update the geological database for some townships which were last mapped in 1926. This year, geological mapping was carried out in Brigstocke and Kittson Townships, which are situated west of the Town of Latchford. The local geology consists of Archean granitic and volcanic rocks overlain by Proterozoic sedimentary rocks of the Gowganda and Lorrain Formations, which are intruded by a Nipissing diabase sill. The presence of these rocks, which are typical of the Cobalt silver camp, suggests possible similar mineralization. However, only a few minor silver-cobalt bearing quartz or calcite veins have been discovered in this area. It is hoped that the mapping project will uncover more of these veins and ultimately encourage future mineral exploration. This program is funded by COMDA.

A. Fyon and assistants continued field work on the Temagami Minerals Project; a multi-year investigation of the mineralogy of Strathy, Chambers, Briggs, and Strathcona Townships. In 1987, rock types in Strathy and parts of Chambers Townships were examined for evidence of alterations in the rocks which could be linked to the presence of concentrations of certain metals (eg. copper, zinc, nickel, platinum, gold, silver). This program is also funded by COMDA.

R.J. Rice and D. Watson continued their study of paleoplacer gold potential in the Lorrain Formation within the Cobalt Embayment. The objective of this project is to determine if the Lorrain Formation sediments represent an ancient river system and, more importantly, to determine if they contain potential for placer gold deposits.

ENGINEERING AND TERRAIN GEOLOGY SECTION

J. Alcock continued a program of surficial mapping and reconnaissance scale surface till sampling in the Sinclair Lake area, National Topographic System (NTS) Map 41P/14, as part of a report on the Quaternary geology of the Shining Tree Area. The objectives of the program are to determine the distribution and stratigraphy of Quaternary sediments and to expand the area's geological database for use in mineral exploration, and forestry and aggregate resource planning. Preliminary results of the till sampling program indicate that, in surface till samples collected immediately down-ice of known gold occurrences, significant numbers of gold grains are found in the sand-sized heavy mineral fraction, and anomalous gold values are present in the silt and clay fraction.

RESEARCH BY OTHER ORGANIZATIONS

GEOLOGICAL SURVEY OF CANADA

P. Frisk, Mineral Resources Division, completed a regional reconnaisance sampling program of lake sediment and water over a 40 000 km^2 area encompassing NTS Maps 41P, 41I, 41H(N1/2), and 31M to the Quebec border. A total of 3100 sites were sampled. The lake sediments were assayed for 22 elements including gold, and the water was tested for six elements. The data will be published as two Open File Reports, in early 1988. The results will provide a guide to areas of anomalous trace element values that may be related to potential mineralization.

R. Eckstrand and assistants, Mineral Resources Division, collected samples for a collaborative study with P.C. Lightfoot, University of Toronto, in the Temagami area and Kerns and Hudson Townships. R. Eckstrand is studying the sulphides associated with the Nipissing diabase.

V. Ruzicka, Mineral Resources Division, studied the metallogenic features of the Cobalt area with special emphasis on uranium, silver, and cobalt. Samples of ore from the Foster Mine displayed in Northern Ontario's Cobalt Mining Museum were found to contain two percent uranium and nine percent thorium.

K. Buchan, Lithosphere and Canadian Shield Division, continued paleomagnetic testing of the Nipissing diabase and Abitibi dikes, in the Englehart area, to determine if the Nipissing was emplaced as two, or three, separate intrusions.

M. LaRose collected rock and mineral samples for use in rock and mineral sets distributed by the Geological Survey of Canada.

UNIVERSITY OF OTTAWA

G. Burbidge continued working on a Ph.D. thesis investigating the sedimentology of the Gowganda Formation. No field work was undertaken this summer.

UNIVERSITY OF TORONTO

P.C. Lightfoot, a former Post-doctoral Fellow at the University, continued a study into the petrogenesis of the Nipissing diabase using combined trace element and Sr-, Nd- and Pb-isotope techniques. The study's purpose was to determine what roles partial melting and fractional crystallization played in the petrogenesis of the diabase, to determine the nature of the source regions of the magmas, and define the extent of interaction of the magma with crustal rocks. During the summer of 1987, styles of contamination of the Nipissing diabase were studied in the Obabika intrusion on the Northwest Arm of Lake Temagami, and in Kerns and Hudson Township.

UNIVERSITY OF WESTERN ONTARIO

J. Aultman initiated a B.Sc. study investigating gold dispersal in till down-ice of a known gold occurrence located near Shining Tree.

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13. Sudbury Resident Geologist's Area—1987

W. Meyer[1], R.W. Campbell[2], and B.I. Gates[3]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

[2]Staff Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

[3]COMDA Contract Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

INTRODUCTION

The Sudbury Resident Geologists's district encompasses about 27 500 km^2 (Figure 13.1). Boundary changes early in 1987 resulted in a shift in the distribution of rock types exposed in the area from that reported in earlier years. Geologically the area can be divided as follows:

Paleozoic: Ordovician and Silurian marine sedimentary rocks on Manitoulin and several smaller islands. These underlie about 18 percent of the area.

Proterozoic: Grenville Province. Almost 22 percent of the area belongs to the Grenville Front Tectonic Zone and Metasedimentary Gneiss Belt. 160 km of the Grenville Front lies within the area.

Proterozoic: The Sudbury Igneous Complex and Whitewater Group sedimentary rocks cover about 4 percent of the area.

Proterozoic: Southern Province. Clastic and chemical sedimentary and volcanic rocks and diabases of the Huronian Supergroup underlie about 25 percent of the area.

Archean: Granites, gneisses, and greenstones (volcanic-sedimentary belts) of the Superior Province underlie about 31 percent of the area. Unfortunately few greenstone belts occur, the ratio of granite to volcanic-sedimentary rocks being about 20:1.

Glacial till and postglacial organic matter cover much of the bedrock.

The area is well known for its large nickel-copper-precious metal mines, which are associated with the Sudbury Igneous Complex, many precious and base metal occurrences outside the Sudbury Igneous Complex, and numerous enigmatic geological features. These draw many companies, prospectors, and visitors to the area each year.

A major staking rush took place early in the year when several companies staked large tracts of land outside the Sudbury Igneous Complex to assess the platinum potential.

STAFF

Staff working out of the Resident Geologist's office in 1987 and a summary of their functions were as follows:

P.E. Giblin, Manager, Mineral Resources, Northeastern Region;

W. Meyer, Resident Geologist;

R.W. Campbell, Staff Geologist;

T.L. Livingstone, Secretary to the Manager, and part-time secretary to the Resident Geologist.

F. Toews, M.E. Grant, and M. Napoli worked on a report and maps covering their two-year gold study between Sudbury and Espanola until March 31.

L.B. Jerome worked on contract on Geological Data Inventory Folios (GDIFs).

R. Adlington worked on contract on GDIFs until June 30.

J.K. Lacey worked on contract as field and office assistant during summer and fall. In November and December he worked on GDIFs.

M.J. Matijevich worked for the summer on the history of mining in the Sudbury area and as field assistant under the Experience '87 Program.

B.I. Gates joined the staff on contract in June as COMDA geologist for the Sudbury Mineral Occurrence Study.

BOUNDARY CHANGES

On February 16, 1987, new boundaries came into effect for all Resident Geologists in the province.

Twenty-eight townships, about 2600 km^2, were added to the Sudbury Resident Geologist's area along the northern boundary. The rocks here are partly Archean granites and volcanic-sedimentary, and partly Lower Proterozoic Huronian Supergroup sedimentary and intrusive diabases.

Fifteen townships, about 3100 km^2, south of Lake Nipissing, are now part of the Dorset Resident Geologist's district.

The new distribution is reflected in Figure 13.1.

OFFICE RELOCATION

In early 1988, the offices of the Manager, Mineral Resources, Northeastern Region, Mines and Minerals Division; the Sudbury Resident Geologist; and the Mining Recorder will relocate from the 10th Floor of the Provincial Government Building at 199 Larch Street to the 6th Floor at 200 Brady Street, which is the western office tower in the Sudbury Civic Square.

STAFF ACTIVITIES

Staff of the Resident Geologist's office responded to 401 enquiries about the geology of the area, mineral occurrences, conceptual ideas, government programs, and rock and mineral identification. Staff visited properties, and discussed problems in the field with property owners.

In April and May, we ran two 15-hour introductory prospecting classes for the public. Of the 100 persons who registered, 85 completed the course. Our aim in part was to reach persons on early retirement, and in this we were successful. The feedback has been good, and we plan to offer another course in early 1988.

In July, our office participated with a display booth at the 5th Annual Sudbury Gem and Mineral Show.

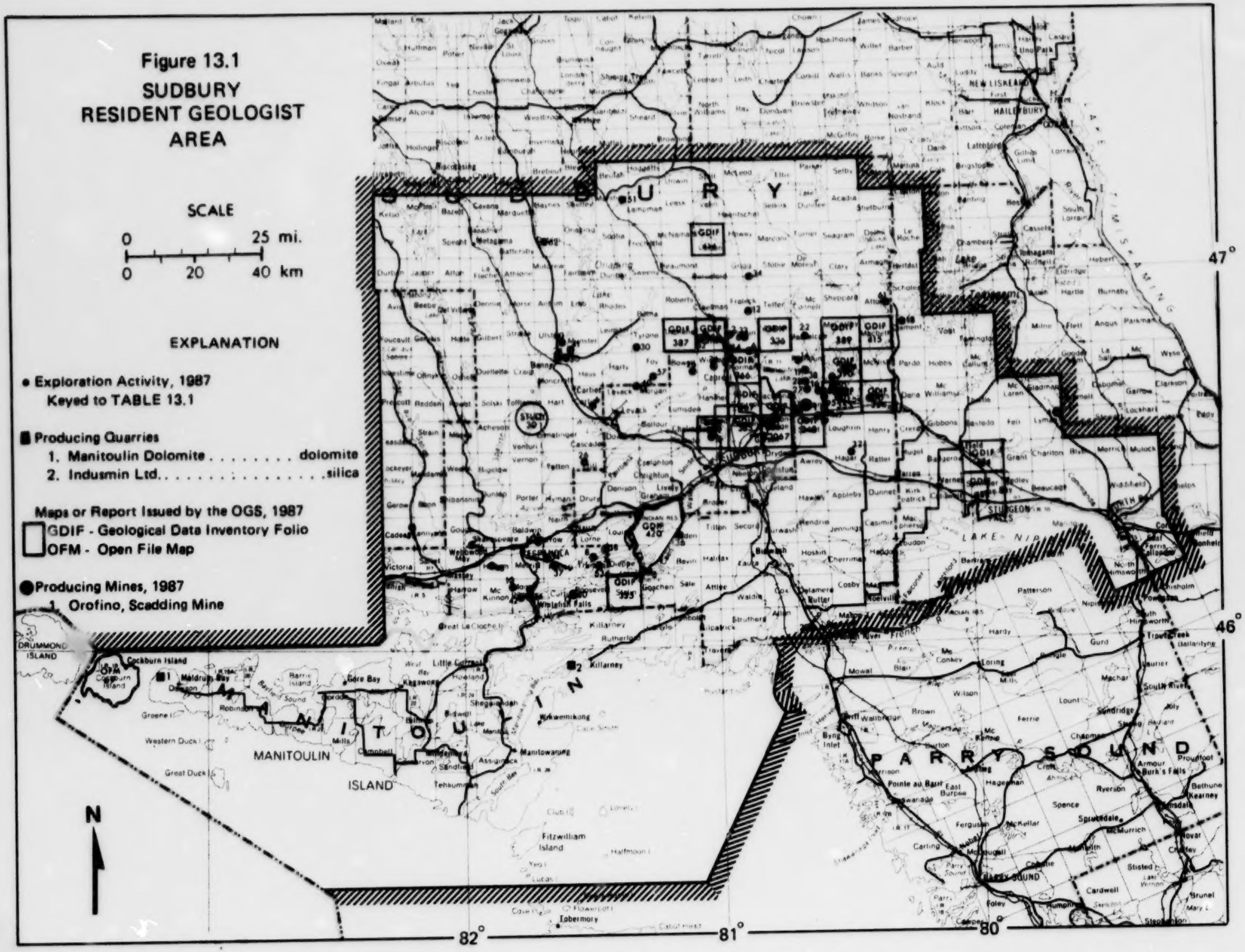


Figure 13.1
SUDBURY
RESIDENT GEOLOGIST
AREA

SCALE

0 25 mi.
0 20 40 km

EXPLANATION

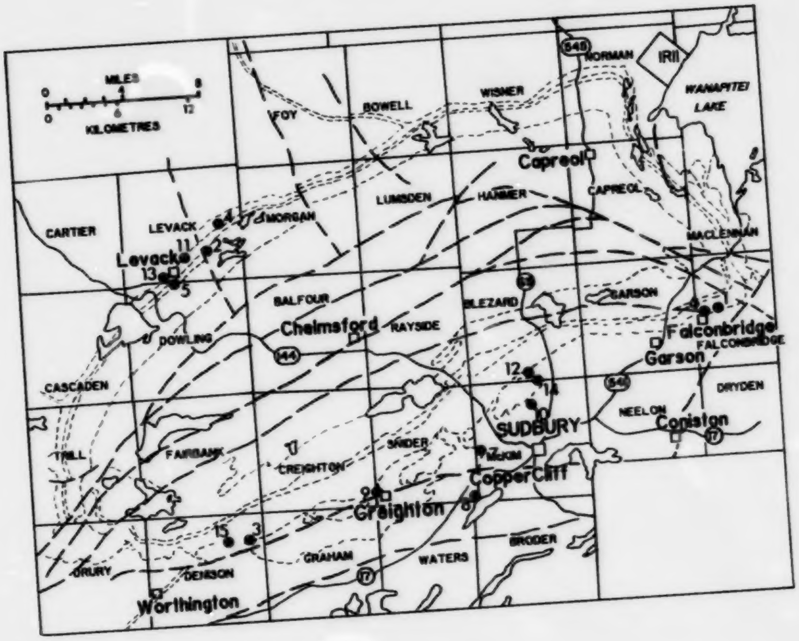
- ● Exploration Activity, 1987 Keyed to TABLE 13.1
- ■ Producing Quarries
  1. Manitoulin Dolomite . . . . dolomite
  2. Indusmin Ltd. . . . . silica

Maps or Report Issued by the OGS, 1987
- ☐ GDIF - Geological Data Inventory Folio
- ☐ OFM - Open File Map

- ● Producing Mines, 1987
  1. Orofino, Scadding Mine

N
SUDBURY
MANITOULIN
PARRY SOUND
LAKE TIMISKAMING
LAKE NIPISSING
MANITOULIN ISLAND
DRUMMOND ISLAND
Cockburn Island
NEW LISKEARD
HAILEYBURY
ESPANOLA
STURGEON FALLS
PARRY SOUND
Killarney
Tobermory
Fitzwilliam Island
Little Current
Gore Bay
Manitowaning
Wikwemikong
Byng Inlet
Burk's Falls
47°
46°
82°
81°
80°
GDIF 387
GDIF 336
GDIF 389
GDIF 315
GDIF 420
GDIF 395
OFM 5047

***Figure 13.2.** Sudbury mining camp.*


MILES
0
4
8
0
6
12
KILOMETRES
FOY
BOWELL
WISNER
546
NORMAN
IRII
WANAPITEI LAKE
Capreol
CAPREOL
LUMSDEN
HANMER
CARTIER
LEVACK
MORGAN
Levack
MACLENNAN
BALFOUR
BLEZARD
GARSON
Chelmsford
RAYSIDE
DOWLING
144
69
Falconbridge
FALCONBRIDGE
Garson
CASCADEN
DRYDEN
NEELON
Coniston
SUDBURY
TRILL
FAIRBANK
CREIGHTON
SNIDER
MCKIM
Copper Cliff
Creighton
DRURY
DENISON
GRAHAM
WATERS
BRODER
17
Worthington
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

EXPLANATION

● Producing Mines, 1987

Falconbridge Ltd. .... Co, Ni, Cu, Pt, Au, Ag

1. East Mine
2. Fraser Mine
3. Lockerby Mine
4. Strathcona Mine
5. Onaping Mine
6. Falconbridge Open Pit No. 1 Shaft

Inco Ltd. . . . Ni, Cu, Pt, Se, Te, Co, Au, Ag, S02, H2S04

7. Copper Cliff North Mine
8. Copper Cliff South Mine
9. Creighton Mine
10. Frood Mine
11. Levack Mine
12. Little Stobie Mine
13. McCreedy West Mine
14. Stobie Mine
15. Crean Hill Mine

The Resident Geologist gave two evening geology talks to tourists at nearby provincial parks, one to Junior Rangers, and one to the Sudbury branch of the Prospectors and Developers Association on "Soda Metasomatism as a Local Guide to Finding Gold".

In August, the Sudbury Resident Geologist's office took Dr. Lou from Jiangsu Province of China on a two-day field trip of the Sudbury Igneous Complex and some of the complex geological showings west of Sudbury. In October the office hosted a five-man delegation from Jiangsu Province for a day. The group went on an underground tour of Inco Limited's South Mine, a geological surface tour of the South Range hosted by Sudbury Resident Geologist's staff, and visited Falconbridge Limited's new core facilities.

In late September, staff took a group of geography teachers on a one-hour aerial tour of the Sudbury mining areas. This is an annual event which has become very successful. The tour is organized by the Ontario Mining Association (OMA). Each year it offers 35 to 40 geography teachers, from Southern Ontario, the opportunity to tour Northern Ontario mining areas for one week. The aerial tour is one part of this. The feedback has been good; the teachers feel that they are getting a better understanding of Northern Ontario and the mining industry in particular. Over the years close to 400 teachers have taken part. This year for the first time two teachers from Northern Ontario (Sudbury) were on the tour.

One year ago, in conjunction with the OMA teachers tour, our office prepared an audiovisual presentation of the aerial tour. The OMA and several teachers asked that this be made available for classroom use. In 1987 we, improved the photography and narration, and then handed the material to the Ministry's Communications Services Branch for final editing to give it a professional touch.

GEOLOGICAL DATA INVENTORY FOLIOS (GDIFs)

In 1987, staff worked on 32 GDIFs. By year-end, 20 had been published, 11 were in press, and 1 in preparation. Those published are included in Table 13.2.

SUDBURY MINERAL OCCURRENCE STUDY

COMDA Project A.4.7. by B.I. Gates

In June 1987 a two-year project was initiated to investigate known mineral occurrences in the Wanapitei Lake area to the northeast of Sudbury. The program is funded under the Canada-Ontario Mineral Development Agreement (COMDA) with the purpose of gaining a better understanding of known mineral occurrences and thereby assisting private sector exploration to find new mineral deposits.

Several properties were mapped and sampled. These included newly exposed mineral showings, known occurrences, some of which are now better exposed because of recent work, and others where it was felt a new look at the geology was warranted.

Upon completion of this project, an Open File Report will be available containing the results of the field and laboratory studies. Hopefully it will contain new ideas on the controls of precious metal mineralization and thereby outline areas of high potential for new discoveries.

The properties examined are all gold or copper-gold occurrences located east of Wanapitei Lake within the townships of Maclennan, Scadding, and Davis. The area is underlain mainly by sedimentary rocks of the Huronian Supergroup intruded by Nipissing gabbro sills, dikes, and irregular bodies. The gold mineralization is of two types: (1) quartz-carbonate veins and stockworks associated with Nipissing gabbro, faulting, or brecciation; and (2) gold mineralization accompanying albite alteration.

This albite alteration can be from tan to pink in colour, massive to highly brecciated, and often with well-developed carbonate rhombohedra which may in part be replaced by chlorite and/or sulphides. Several of the new properties being explored, as well as a few old occurrences, are associated with albite alteration. Soda metasomatism becomes an increasingly more widespread and complex phenomena as our knowledge of the geology in the area increases (Meyer *et al.* 1986). A more complete assessment of the extent of this alteration will be required before this major chemical event can be fully understood.

A. Hazlett Property

This is the former Red Rock Mine located in Scadding Township (UTM coordinates 529150E, 5168700N). The property was discovered in the early 1920s at which time spectacular samples of free gold were reported. In 1925 a shaft was sunk to about 50 m by the McMillan Development Company and 347 m of lateral work was completed on the 30 m level. However, by August 1925 all mining operations had stopped. Mid-Continent Goldfields Limited carried out considerable trenching in 1931 but the property has seen little activity since that time. In 1984 the present owner commenced a re-evaluation of the property and considerable stripping has been carried out in the area to the north of the shaft.

The property is underlain by a large northwest trending Nipissing gabbro sill which has intruded wackes and minor arkoses of the Gowganda Formation. Recent work has exposed a large number of carbonate-quartz veins within the Nipissing gabbro.

The main structure, mapped at a scale of 1:125, consists of a complex system of carbonate-quartz veins trending 030° for 350 m from the shaft. This system is up to 30 m wide but narrows to less than 10 m at the north end where the gabbro is in contact with the sediments. Veins and stockworks of carbonate-quartz are located within an often schistose chloritic alteration of the gabbro. A zone of quartz-carbonate impregnated gabbro often forms a halo to the narrow veins and also occurs as masses up to 4 m by 3 m in size with incorporated quartz-carbonate vein material. The veins vary from 10 cm wide white quartz to 1.5 m wide iron- and magnesium-rich carbonate which rapidly weathers to a deep reddish brown. Gold can be panned from this weathered material, but crushed material of the vein itself gives very low results. Contacts with unaltered gabbro are sharp and no single vein can be traced for any length. Veins strike from 270° in the south to

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 13.1 Continued

Number on Figure	Individual or Company	Activity
1	Allard, John	STr
2	Barry, H. V.	Manual Work, Exploration
3	Blue, P. G.	SA, Manual Work, Compressed Air
4	Binney, P.	Exploration
5	Bradley, D. J.	Power STr
6	Brady, J.	DD, Power STr, SA, Compressed Air, Manual Work
7	Brink Mining & Resources Co.	Linecutting, VLF, Mag
8	BP Canada Selco Division	A Geophys.
9	Brown, D.	Manual Work
10	Brunne, D. A.	STr, Manual Work, Shaft Sinking
11	Crimson Star Res. Ltd.	A
12	Deroy, V.	Exploration
13	Elliot, A. T.	Expenditures, Geol.
14	Exsics Expl. Ltd.	Linecutting, Geophys.
15	Falconbridge Ltd.	DD, Geophys.
16	Fielding, R.	Manual Work, Power STr, Compressed Air, GL
17	Flag Resources	DD
18	Foubert, A.	Exploration
19	Geoconsulting Services	Mineral Exploration
20	Gervais, J. C.	Manual Work, Compressed Air
21	Guiding Resources	Power STr
22	Hecla Mining Company	Exploration
23	Huycke, J. G.	Manual Work
24	Imperial Metals Corp.	EM, Mag
25	Inco Ltd.	DD
26	Isaac Burns Metals Inc.	DD
27	Jerome, A. E. Jr.	DD, Geophys.
28	Komarechka, R. G.	GL
29	Kidd Creek Mines Ltd.	Geophys., Power STr
30	Larson, R.	Exploration
31	L. J. Bardswich Ltd.	Exploration
32	Mainville, C.	Exploration
33	Marsten Investments	DD
34	Mill City Gold Inc.	Geophys.
35	Naples, R.	Geochem
36	New Augarita Porcupine Mines Ltd.	DD
37	Nickeldale Resources Inc.	Geophys.
38	Noramco Exploration Inc.	Mineral Exploration
39	Noranda Exploration Ltd.	STr
40	Norwin Resources Ltd.	Linecutting, mapping
41	Offset Natural Resources Ltd.	Grab SA
42	Orevco Ltd.	SA, GL, DD (vibracore)
43	Orofino Resources Ltd.	Power STr
44	Owen, J.	STr, Tr

TABLE 13.1 Continued

Number on Figure	Individual or Company	Activity
45	Pantan Resources Inc.	Linecutting, SA, Geophys., DD
46	Pelangio Larder Mines Ltd.	Geochem
47	Plexman, E. J.	Geophys., STr
48	Portfield Industries Inc.	SA, DD, STr, Tr
49	Ranex Minerals Inc.	Manual Work
50	Reed, E.	DD, Power STr
51	Salo, G.	Linecutting, Geophys.
52	Stringer Exploration Ltd.	DD, Geophys.
53	Sudbury Canadian Granite	Manual Work, Power STr
54	Tintina Mines Ltd.	Geophys.
55	United Reef Petroleums Ltd.	DD
56	Uranex Resources Ltd.	Grab SA
57	Vanlith, G.	Manual Work
58	White, J.	Manual Work, Compressed Air, STr
59	Wright, R. J.	DD
60	Young, J. R.	Exploration

360° in the north. Pyrite is disseminated in small amounts within the vein material.

Many quartz-carbonate veins within shear zones can be located elsewhere on the property. The general trend is 330° to 360° dipping 50°E. They reach a maximum width of 50 cm but are generally 5 to 30 cm wide. One shear system containing two veins can be traced for 300 m.

One oddity is a 3 m by 12 m block of what appears to be a carbonatized sedimentary breccia (?) located within the gabbro at least 80 m from the nearest sediments.

T. Sheppard Property

This is located at the south end of Wanapitei Lake in Maclennan Township (UTM coordinates 520500E, 5170100N). A 1000 m by 160 m band of northeast-trending arkosic sandstones of the Mississagi Formation is in faulted contact with Nipissing gabbro. Massive sulphides consisting of granular pyrite, arsenopyrite, chalcopyrite, and gold were discovered along the side of a hill in 1980. Some trenching and stripping has taken place over a 200 m by 40 m area which has been mapped at a scale of 1:150.

The mineralization is structurally controlled. A zone of weak shearing strikes at 063° and dips near vertical. It extends from the north end of the outcrop and breaks into narrower subparallel shears that are eventually lost to the south. This zone reaches a maximum width of 1.5 m but on average is only 0.2 m wide. This shear is intersected by a series of tension fractures at 307° dipping 80°S which are from 1 mm to 15 cm wide and up to 40 m long. Orange-red, fine-grained albite, minor carbonate, quartz, and erratically distributed sulphides are associated with these two systems. The mineralization is best developed within the 063° shear or near the junction with the 307° fractures but may also extend at least 15 m along these fractures. One block of massive sulphides 3 m by 1.5 m appears to be only 0.6 m thick and sits on unmineralized arkose.

To the south and west of the main zone, good Sudbury-type breccia with numerous pseudotachylite dikes cut the arkose. Arkosic and gabbroic clasts are present indicating an age younger than Nipissing gabbro. Several of the pseudotachylite dikes in turn are cut by narrow, 10 cm wide zones of reddish albite alteration striking 060°.

The mineralization outcrops on the west side of a narrow valley covered by glacial till. The sulphides, where exposed, are heavily weathered. Down the slope from the mineralization the base of the till has been cemented by iron oxides in a broad zone up to 0.7 m thick. The iron presumably was liberated from the pyrite and travelled downslope to be redeposited at the bedrock-till interface. The presence of iron-cemented basal tills may be useful in indicating sulphide minerals somewhere up the hydrological slope.

Ashigami Lake Breccia

Strong brecciation is located within rocks of the Gowganda Formation near the centre of Scadding Township (UTM coordinates 530900E, 5168150N). The main outcrop is a low hill bounded by overburden to the north and east. The main breccia covers an area 100 m by 100 m with isolated outcrops 100 m further west and 100 m to the southeast. This has been mapped on a scale of 1:500.

It appears that the host greywacke was strongly fractured and then flooded by quartz and carbonate. The matrix shows a rough east-west trend and breccia has been intersected by diamond drilling at a depth of 110 m. The fragments are angular and of all sizes up to 1.5 m. They are dark green, fine grained, chloritic, and contain the occasional dropstone up to 5 cm in size. The matrix can be feathery to 15 cm wide of mostly white quartz with less than 10 percent carbonate. It can be vuggy with good quartz crystals up to 3 cm in size and occasional calcite crystals on the quartz. Chalcopyrite is scattered within the matrix, often associated with carbonate or along the matrix-fragment contact which can be chloritic. A bulk sam-

TABLE 13.2. MAPS AND REPORTS PERTAINING TO THE SUDBURY RESIDENT GEOLOGIST AREA PUBISHED DURING 1987 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports	
OFR 5643	Contamination and Genesis of the Sudbury Ore
Geological Data Inventory Folios	
GDIF 335	Hansen Township
GDIF 336	Aylmer Township
GDIF 340	Street Township
GDIF 353	Davis Township
GDIF 354	Janes Township
GDIF 366	Norman Township
GDIF 367	Capreol Township
GDIF 378	Maclennan Township
GDIF 379	Blezard Township
GDIF 385	Garson Township
GDIF 386	Falconbridge Township
GDIF 387	Kitchener Township
GDIF 388	Hutton Township
GDIF 389	McCarthy Township
GDIF 390	Kelly Township
GDIF 414	Cotton Township
GDIF 415	MacBeth Township
GDIF 420	Indian Reserve #6
GDIF 421	Field Township
GDIF 422	Springer Township
Maps	
Map 2505	Mines and Minerals Division Administrative Areas and Offices
Map 2518	Surficial Geology of Northern Ontario
P. 3067	Precambrian Geology, Falconbridge Township
OFM 69	Paleozoic Geology of Cockburn Island, Manitoulin Island
Aggregate Resources Publications	
ARIP 140	Aggregate Resources Inventory West of Sudbury, Regional Municipality of Sudbury and District of Sudbury
Ontario Geological Survey Reports	
MP 77	Index to Published Reports and Maps, Mines and Minerals Division 1978-1986
MP 134	Report of Activities 1986
Miscellaneous Publications	
Study 30	Geology of Carbonatite-Alkalic Rock Complexes in Ontario: Spanish River Carbonatite Complex
Score	A Computer Analysis of the Mineral Industry of Ontario to 31 December, 1986

ple averaged 0.22 percent copper with negligible gold values.

The origin of the breccia is unclear but may be related to the McLaren Lake fault 650 m to the northeast. This area contains some outcrops of unaltered greywacke but heavy drift cover may conceal the true extent of the breccia.

Norstar Property

In Davis Township, the Norstar property has seen earlier exploration on areas now believed to be zones of intense soda metasomatism. The largest area (UTM coordinates 536400E, 5166150N) is near an old adit about 1200 m southwest of the orebody mined by Orofino Resources Limited in 1985 and 1986 under a joint venture agreement with Groundstar Resources Limited. The alteration covers an area 350 m by 150 m.

The property is underlain by massive and laminated wackes of the Gowganda Formation. The contact of the soda alteration with unaltered rocks, where observed, is sharp, with minor brecciation and narrow albite stringers located up to 3 m from the contact. The albite alteration is massive looking, very fine grained, grey, buff yellow to pink in colour, with good carbonate rhombs up to 3 cm in size. These are partially replaced by sulphides. One zone, 30 cm wide, contains up to 60 percent carbonate rhombs.

Occasionally a good breccia is developed containing yellow or pink fragments and angular clasts up to 15 cm of alternating pink and yellow laminations (after greywacke?) in a pink matrix with reddish-weathering carbonate rhombs. Some of these rhombs can be seen developing within the laminated clasts and the laminations can be traced through the rhombs. The predominant sulphide is pyrite, often occurring along fractures. Some chalcopyrite and erythrite (cobalt bloom) were also observed. At least two other smaller alteration zones are located within 500 m of the adit.

D. Bradley Property

On this property in Davis Township (UTM coordinates 536150E, 5165500N), an old pit is located on the side of a hill which has recently been cleared of trees. A zone of very fine-grained, yellowish soda alteration, in part brecciated, occurs on a low hill almost completely surrounded by swamp. Minor pyrite, arsenopyrite, chalcopyrite, and erythrite (cobalt bloom) were observed. Carbonate rhombs are present and aid in recognizing the more subtle forms of alteration in the field. About 40 m to the west, a good Sudbury-type breccia is located within well-laminated greywacke. Late narrow blue-grey quartz veins crosscut the alteration and greywacke near the zone.

Another occurrence on the property (UTM coordinates 536600E, 5165700N) has recently been stripped over a 100 m by 30 m area. The outcrops are poorly exposed but it appears that tan-coloured sodium alteration is related to discontinuous east-west shearing within Gowganda wackes. Carbonate rhombs and late quartz veining are scattered throughout the area. The soda alteration appears to have been brecciated and filled to a width of 7 cm with pyrite containing minor arsenopyrite concentrated along the contact. A poorly exposed outcrop of chlorite breccia or Sudbury-type breccia is located just south of the best sulphide showing.

Crerar Occurrence

Located in Davis Township (UTM coordinates 534600E, 5165050N), this old showing was briefly mapped and sampled. The occurrence is similar to other areas of soda metasomatism described previously. The strongest pyrite and chalcopyrite mineralization appears associated with late blue-grey quartz veins.

GEOLOGICAL DEVELOPMENTS

CANADIAN CONTINENTAL DRILLING PROGRAM

A Sudbury committee has been formed under the chairmanship of Don Rousell, Laurentian University. This committee has made a preliminary proposal to the national committee that a 10 km deep hole be drilled in the centre of the Sudbury Structure.

Several countries now have continental drilling programs under way or in the planning stages. Perhaps nowhere in the world can the scientific objectives and economic justifications for a 10 km hole be more clearly defined than at Sudbury.

SODA METASOMATISM

This is an ongoing study, but little progress can be reported on our understanding of this phenomenan (Meyer *et al.* 1986). Two new suspected occurrences need to be chemically confirmed; one is a 60 cm section found in old drill core at the Agnew Lake uranium mine in Hyman Township, and the other a 2 m section in norites of the Sudbury Igneous Complex in a hole drilled by Falconbridge Limited near Levack.

A visit to the Intermediate Zone at the Scadding Mine in Scadding Township shows that carbonate, chlorite, pyrite, and gold are contained in an envelope of metasomatic albite rock.

Other occurrences are described by B.I. Gates in his section on the Canada–Ontario Mineral Development Agreement–funded (COMDA) Sudbury Mineral Occurrences Study.

PYRRHOTITE IN QUARTZ VEINS by R.W. Campbell

Three properties west of Sudbury that were examined exhibit some intriguing geology. The properties are underlain by various formations of the Huronian Supergroup which are intruded by quartz veins. Within the quartz veins are pods of massive pyrrhotite, pyrite, and chalcopyrite. Copper, nickel, and cobalt values vary. Assays as high as 6.55 percent copper in one sample and 8150 ppm nickel in another sample were obtained. The precious metal content is variable as well. One of the samples from the Stratton Lake property assayed 4270 ppb gold. The highest gold value attained from the Salo property on the south shore of Lake Panache was 575 ppb. Samples from the Salo property were slightly elevated in palladium (up to 75 ppb) but assayed less than 1 ppb platinum.

A sample taken from a massive sulphide pod on E. Stringer's property in Foster Township assayed 6.55 percent copper, 100 ppb gold and 120 ppb palladium. Again, as on the Salo property, there is less than 1 ppb platinum.

The sulphide pods vary in size from 30 cm to about 5 m across and at least 2 m deep. The largest observed pod is located in Truman Township on the Salo property. This was pitted and trenched in 1933. There is no assessment report, just work reported on the claim.

The full extent of these pods west of Sudbury is unknown. The presence of so much pyrrhotite in quartz veins, and anomalous nickel and palladium, make these pods puzzling features.

MINING ACTIVITIES by R.W. Campbell, W. Meyer

SUMMARY

Mining of nickel, copper, and precious metals by Falconbridge Limited and Inco Limited continued to dominate mining activities in the area. Orofino Resources Limited milled ore from the Norstar Mine in Davis Township, and from the Intermediate Zone at the Scadding Mine in Scadding Township. Emerald Lake Resources Incorporated produced its first gold from the Golden Rose Mine in Afton Township. Other commodities produced were dolomite, silica, and sand and gravel.

NICKEL—COPPER—PRECIOUS METALS

1987 saw an increase in the prices of both copper and nickel; copper prices rose to the $1.00 range and nickel prices rose to the $3.00 range by the end of 1987. This was welcome news for both Inco Limited and Falconbridge Limited.

Inco Limited operated nine underground mines, three mills, one smelter, two refineries, and one metal strip plant. The company saw third quarter gains of $41.4 million compared with $3 million for the same period in 1986. Earnings amounted to $50.2 million for the first nine months of 1987. Early retirement incentives were offered this year. The shutdown period was only five weeks compared with ten in 1986. Inco is planning a five-week shutdown for 1988.

Inco Limited's all-electric Crean Hill Mine was opened in May. The Garson Mine and open pit remained closed. The company's largest producer, Creighton, lost production toward the end of the year because of problems with the skiphoist motor. Other Inco Limited operations increased production to compensate. The company is hoping for an early return of the motor from repairs.

Late in the year, Inco Limited announced they will be reopening the Coleman Mine east of Levack. The project includes deepening the 695 m shaft to 1051 m and driving two 915 m ramps to access the lower orebody. Full production is expected by 1990.

Falconbridge Limited produced from six mines. Production began on the Craig orebody this year with hoisting from the Onaping Mine. The Falconbridge East Mine and Open Pit No.1 are scheduled to be closed down in June 1988. Falconbridge Limited had a nine-week shutdown during 1987.

The company saw a third quarter net profit of $17 million in 1987 compared with $6 million for the same period in 1986. Earnings for the first nine months of 1987 were $30 million.

GOLD

The 200 ton per day mill at the Scadding Mine of Orofino Resources Limited treated the remaining ore from the Orostar Project in Davis Township, and after that began to treat ore from the Intermediate Zone at the Scadding Mine.

Orofino Resources Limited put down a spiral decline to 100 m below surface, and drifted to the Intermediate Zone on several levels. Established ore reserves are 120 000 tons at 0.22 ounce gold per ton.

In October, the only ball mill broke loose and fell from its mounting. A replacement mill arrived in November, and production resumed.

The Golden Rose Mine of Emerald Lake Resources Incorporated in Afton Township was officially opened on October 7, 1987. The mine has reported proven, probable, and possible reserves to the 300 foot level of 2 483 200 tons containing 0.242 ounce gold per ton.

The mill is rated at 400 tons per day, and recovery is 95 to 97 percent.

INDUSTRIAL MINERALS

Northern Industrial Quarries Limited was active in the Sudbury district this year. The company acquired seven properties in the district including the Alymer Township breccia, the Erana Mines property in River Valley, and the Sheguianda Quarries on Manitoulin Island. The company has also acquired a parcel of land from the Ministry of Government Services at the old Burwash Prison Farm on Highway 69. Northern Industrial Quarries Limited plans to erect a crushing plant on the property. All stone from their quarries in the district will be crushed and stockpiled at Burwash. They plan to be in full production by spring 1988. Initially they will cater to the landscape and precast market with future plans to enter the curbing and dimension stone market if the stone quality warrants it.

Peter Ellero Son Limited have completed the structural portion of their expansion. At present, they are waiting for equipment to be shipped from Italy. The expansion will enable them to cut and polish full-size dimension stone blocks. Peter Ellero Son Limited plan to be fully operational early in 1988. A portion of the expansion was funded under the Employment Incentive Program of the Northern Ontario Regional Economic Development Program (Nor-Dev).

Sudbury Canadian Granite Incorporated was funded under the Resource Diversification Program of Nor-Dev for the removal and testing of a "Black Granite", 22 km north of Massey, Ontario, on Highway 533. The blocks taken were small, roughly 3 by 3 by 4 feet, irregular in shape, and with many fractures. The company has removed equipment from the site.

Standard Aggregates Incorporated began 1986 production on March 1 and continued until freeze-up. To December 10, 1986, the company had produced 1 766 037 tons of dolomite from their Dawson Township quarry. From this, 12 size grades were produced to meet market demands in Canada and the USA.

Ethier Sand and Gravel Limited produced approximately 50 000 tons of rock for silica flux this year. Ethier is quarrying from a quartzose gneiss in Cosby Township.

The Indusmin Division of Falconbridge Limited operated its Badgeley Island quarry between May 10 and October 24 for a total operating time of 100 days. The company produced 360 000 tons of silica during this period.

EXPLORATION ACTIVITIES

Last year's and earlier reports included a histogram showing the annual changes in claim staking activity in the Sudbury Mining Recorder's area. Changes in early 1987 in the Resident Geologist's boundaries and the Sudbury Mining Recorder's boundaries no longer allow a useful comparison to be made.

It has been an unusual year for exploration in the Sudbury area. After several years of low claim staking and exploration activity, companies turned their attention to a different commodity: platinum. Exploration for gold continued, and Falconbridge Limited announced a high grade copper-nickel-precious metal discovery.

Falconbridge Limited and Inco Limited continued to explore their properties in the Sudbury area. Falconbridge Limited took out work permits to drill in Levack, Dowling, Blezard, and Falconbridge Townships, and Inco Limited in Trill, Garson, Norman, and Wisner Townships. This is on patented lands, and few details are known to this office except for the discovery by Falconbridge Limited in Blezard Township, mentioned below.

A major staking rush for platinum group metals took place in the area. This was started by BP Resources Canada Limited, and followed by Inco Limited, Falconbridge Limited, and Kidd Creek Mines Limited.

To the end of November, 5567 claims had been recorded in the Sudbury Mining Recorder's office. It is estimated that as many as 4300 of these were staked around Sudbury primarily for their platinum potential.

Sudbury produces about 150 000 ounces of platinum and a similar amount of palladium as byproducts of Inco Limited's and Falconbridge Limited's nickel-copper production. This makes Sudbury the third-largest platinum producer in the world.

The main target has been Nipissing Diabase, and in particular diabase where this contains copper-nickel showings. Nipissing diabases lie outside the Sudbury Igneous Complex, and intrude Huronian Supergroup sedimentary rocks between Sault Ste. Marie and Cobalt. Nickel-copper occurrences within diabase are common but only in a ring up to about 35 km from the Sudbury Igneous Complex. Why this should be is just one of Sudbury's many geological puzzles, after all, the diabase is older by about 300 million years than is the Sudbury Structure.

In addition to Nippissing Diabase, other mafic rocks have also been staked. Worth mentioning are the East Bull Lake Intrusion north of Massey, and the Shakespeare-Dunlop Intrusion north of Webbwood.

Staking also focussed on the Levack Gneisses, which lie along the north range of the Sudbury Igneous Complex. The gneisses are of granulite metamorphic grade, and may represent upturned lower crust. The gneisses contain many mafic and ultramafic inclusions.

In order to keep so many claims in good standing, companies have resorted to airborne geophysical work, and to date, only limited ground work. The next few years may see some interesting developments.

In late July, Falconbridge Limited announced a remarkable intersection on its Lindsley property in Blezard Township, between 4000 and 4500 feet below surface. The section assayed 2.3 percent nickel, 4.4 percent copper, 0.12 percent cobalt, and 0.44 ounce silver per ton, 0.07 ounce gold per ton, 0.08 ounce platinum per ton, and 0.27 ounce palladium per ton, which translates into better than $400 per ton at end of November metal prices. The company immediately added five machines to the program and increased the Sudbury exploration program from $2.25 million to $6 million. In November, Falconbridge Limited concluded a $10 million drilling contract with Longyear to fully explore the significance of the discovery. Early indications are that this is a difficult target to evaluate from surface, and that eventually an exploration shaft may be needed.

Wm. Klenk continued to search for oil, gas, and brines on Manitoulin Island. He drilled a 251 m hole about 1 km northwest of Sandfield, which produced a brine flow of 72 litres per hour. The brine has a high calcium chloride content relative to other chlorides, and is suitable for dust control on dirt roads. The project was partly Nor-Dev funded.

CAN-MAC Exploration Limited continued stripping, sampling, assaying, and diamond drilling on a system of quartz veins in the northwestern part of Davis Township. The quartz veins strike northwest, dip steeply southwest, have a bluish colour, and are rarely more than 30 cm wide. Sulphides and gold are erratically distributed, but coarse visible gold is quite common. The company drilled 1200 feet in two holes, and sent a 1500 pound sample to the Ontario Research Foundation for mill testing.

United Reef Petroleums Limited controls about 7 km of the Foy Offset Dike, including the old Nickel Offset Mine, in Foy and Bowell Townships. In 1987, the company carried out magnetic work, VLF-EM, Pulse EM, and I.P. surveys, and drilled 34 671 feet in 65 holes.

The most promising area appears to be 4 km southeast of the Nickel Offset Mine, where 11 500 feet were drilled in 19 holes. Copper values up to 8 percent, and nickel values up to 0.5 percent were obtained, although precious metal values are low.

Tintina Mines Limited drilled 7000 feet in 23 holes on a 4-claim property in Gough Township. The property contains an estimated 4 million tons of copper-silica flux material with about 86 percent free silica.

Noramco Mining Corporation drilled north of Levack in the Levack Gneiss Complex. No details were available to this office at year-end.

Orevco Incorporated did vibracore drilling on four claims in Hutton Township to investigate the placer gold potential of gravels along the Vermilion River.

Hecla Mining Company of Canada Limited was into the third year of a program of drilling in MacKelcan Township, on property optioned from Flag Resources (1985) Limited. Hecla drilled 1213 m in five holes. Of these, two 50° holes were drilled into a breccia below Wolfe Lake, two drilled into the No. 2 Zone west of Wolfe Lake, and one at Jess Lake. One hole under Wolfe Lake intersected 0.069 ounce gold per ton over 3.05 m at a depth of 323 m, and the other intersected 0.106 ounce gold per ton over 2.74 m at a depth of 298 m.

Flag Resources (1985) Limited drilled approximately 4725 m on three properties east of Wanapitei Lake.

About 3658 m of this was drilled on the company's Crystal North property in Rathbun Township. This is a 1.5 km long and 40 m wide, dike-like structure of intensely soda metasomatized and brecciated rock. The best intersection was 0.124 ounce gold per ton over 1.52 m.

About 610 m were drilled at the Rathbun Lake platinum showing in Rathbun Township, and south of it on the same Nipissing diabase sill, and about 457 m on a property in Jane Township.

Prophet Resources Limited optioned 17 claims on the Parkin Offset dike south of the Jon Smith Mine from J. Brady. In August, the company announced the results of seven channel samples. The best assay contained 3 feet of 0.799 ounce platinum per ton, 0.049 ounce palladium per ton, and 0.029 ounce gold per ton. The adjacent 3 feet assayed 0.30 ounce platinum per ton, 0.052 ounce palladium per ton, and 0.02 ounce gold per ton.

The company then drilled eight percussion holes under the channel samples and assayed the chips. The best platinum value was 0.08 ounce over 3.3 feet. The results of six diamond-drill holes are not known to this office.

John Brady, a local prospector, controlled about 350 claims by year-end, and had others optioned to various second parties. Brady carried out extensive stripping and trenching on several of his properties.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

Twenty-two agreements were in force with individuals and companies for part or all of 1987 under the Ontario Mineral Exploration Program.

Planned expenditures under these agreements amount to $1 145 700. These will qualify for $285 263 of OMEP assistance.

GEOSCIENCE RESEARCH GRANT PROGRAM

One project funded by the Ontario Geoscience Research Grants Program lies wholly within the area of the Sudbury Resident Geologist.

W.M. Schwerdtner and W. Shanks were in their second year of a planned three-year structural analysis of the Sudbury Structure.

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14. Algonquin Resident Geologist's Area—1987

D.J. Villard[1], M. Garland[2], C. Marmont[2], and R. Keevil[3].

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Dorset

[2]Geologist, Ontario Ministry of Northern Development and Mines, Dorset

[3]Geologist, Ontario Ministry of Natural Resources, Dorset

INTRODUCTION

In March, a decision was made to maintain the Resident Geologist's office in Dorset and not move back to Huntsville. The Dorset complex provides an excellent facility for a Resident Geologist's office. A very successful official opening was held in June.

The second year of a four-year program was completed under the Canada–Ontario Mineral Development Agreement. A major component of this program is a project to evaluate the industrial mineral and rareearth element potential of the Parry Sound–Muskoka–Nipissing area. An evaluation of building stone potential was conducted by the Industrial Minerals Section, Mines and Minerals Branch. The remaining projects for the area were carried out from Toronto by the Ontario Geological Survey and dealt with Precambrian mapping, Quaternary mapping, and aggregate assessment.

Exploration for industrial minerals, precious metals and platinum group elements was the main activity undertaken by mining companies and prospectors during 1987. Emphasis was placed on graphite, silica, building stone, gold, and platinum. In October, Cal Graphite Corporation formally announced that it would be putting its Butt Township graphite deposit into production in the fall of 1988.

RESIDENT GEOLOGIST'S ACTIVITIES

The office of the Resident Geologist for the Algonquin Region is located in Dorset, about 30 km southeast of Huntsville. The office is currently staffed by David Villard, Resident Geologist; Mary Garland, Chris Marmont, Rick Keevil, and Philip Zuberec, Contract Geologists; and Jenny Reed, Secretary. Marc Johnston, who had been working here for the past year, left in September to work in the private sector.

As in previous years, much of the Resident Geologist's time was spent on consultative duties, with requests for information or assistance coming from companies and individuals engaged in mineral exploration and development in the area. A significant amount of time has been spent working with Cal Graphite Corporation and their consultants with regard to their graphite deposit. The Resident Geologist has been able to co-ordinate the company's dealings with the various Provincial Ministries and the public.

Mary Garland's report on the graphite potential of the Central Gneiss Belt was released in the spring of 1987. Detailed work on the geology and mineralogy of the Cal Graphite Deposit continued in 1987, with a report to be published in the spring of 1988.

Chris Marmont and Marc Johnston continued a four-year study, funded under the Canada–Ontario Mineral Development Agreement. This project is attempting to evaluate the industrial mineral and rare earth element potential of the Parry Sound–Muskoka–Nipissing area. Two reports were released in 1987.

Our program of mineral education continued with sessions in several Provincial Parks, public schools, and the Leslie M. Frost Natural Resources Centre. In 1987, the Ministry of Northern Development and Mines decided to fund the Minerals Program at the Frost Centre for 1987-1988, and Rick Keevil was hired in September. A display was set up at the end of August, in the Ontario North Now Pavilion at Ontario Place in Toronto, as part of Parry Sound Week. The display portrayed geology, mineral collecting, and building stone of the Parry Sound area.

INDUSTRIAL MINERAL AND RARE EARTH ELEMENT STUDIES

Field work for the second year of a four-year program to evaluate the industrial mineral and rare-earth element potential of the Muskoka–Parry Sound–Nipissing area was completed. This project is funded under the Canada–Ontario Mineral Development Agreement (COMDA), which is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario.

The results of the first year's work were reported by Marmont (1986), Marmont and Johnston (1987), and Marmont (1987). Field work, in 1987, concentrated on anorthosite, marble, and building stone, with some time devoted to a reconnaissance of the northwestern part of the study area. A minor amount of time was spent examining pegmatites for their feldspar and rareearth element potential.

Work on anorthosite was directed towards characterizing the chemistry and mineralogy of several intrusions to determine the suitability of such material for the insulation, glass, and ceramics industries.

Work on marble was aimed at determining the distribution of calcitic and dolomitic varieties, with emphasis on types and amounts of impurities, with the aim of identifying areas which might be suitable for development as sources of pulverized, pure carbonate for use in industrial applications. In addition, a detailed study was performed on the suitability of Parry Sound marble for agricultural purposes. To supplement this study, Open File Map 72 (Marmont 1987), with accompanying notes, entitled "The Suitability of Marble (Limestones) in the Parry Sound Area for Agricultural Applications", was released on October 9, 1987, for the benefit of the local farming community.

The building stone component of the study was a reconnaissance survey, performed largely in the western and central parts of the project area. This was undertaken to determine whether or not gneisses are present which compare favourably with existing commercial products, notably those from Brazil and India.

GRAPHITE PROJECT

On completion of the graphite project early in 1987 (Garland 1987), a decision was made to carry out additional, detailed work on the deposit in Butt Township. This is the deposit that Cal Graphite Corporation has decided to bring into production in 1988. The objectives of this detailed work are to gain an understanding of the complex geology of the graphite-bearing rock units; to acquire more information about the distribution of the graphite and what controls this distribution; and, to construct, with the aid of diamond-drill sections, a three-dimensional picture of the deposit.

An area of two hectares was stripped by the company and mapped by Mary Garland in 1987, at a scale of 1 cm to 2 m (1:200). Results of this work will be published in the spring of 1988.

PLATINUM GROUP ELEMENTS AND PRECIOUS METALS PROJECT

This project, initiated in 1987, was designed to study platinum group elements and precious metals in the area covered by the Algonquin District office. The goals of the project are to compile all existing information; to assess the potential of this part of the Central Gneiss Belt; and, to postulate a metallogenic pattern for these metals.

OTHER GEOLOGICAL ACTIVITIES

LESLIE M. FROST NATURAL RESOURCES CENTRE

During the first quarter of 1987, R. Keevil acted as Lands, Waters, and Minerals Specialist. In July, J. Stocking returned to the Centre from a three-year secondment, as Lands and Waters Specialist, and hired J. Etches as a Geological Assistant to help with mineral programs during the summer months. R. Keevil returned as Minerals Specialist in September, with funding provided by the Ministry of Northern Development and Mines.

The Centre reports 8959 user-day opportunities in the minerals program during 1987, which represents over 20 percent of the total interpretive programs at the Centre. Their project to evaluate the lapidary-stone potential of the area continued with help from the Ontario-Quebec Student Exchange Program and results of this ongoing inventory are available for viewing at the Centre. The Frost Centre assisted in staffing the Ministry of Northern Development and Mines booth at the Gemboree in Bancroft, and conducted extension lectures and field trips for Junior Rangers and the Parry Sound High School. The rock and core storage facility was rebuilt during August with help from the Centre's Junior Ranger program, and the geological map of the Centre area has been updated with assistance from M. Easton (Geologist, Precambrian Section, Ontario Geological Survey). The Centre also helped in the preparation of rock samples for projects carried out in the Resident Geologist's Office.

ONTARIO GEOLOGICAL SURVEY

Four geological field parties were active in the area; all were funded under the Canada–Ontario Mineral Development Agreement.

G. McRoberts and L. Tremblay (McRoberts and Tremblay 1987) of the Precambrian Geology Section, Ontario Geological Survey, carried out a detailed (1:15 840) geological mapping project in the area northeast of the Town of Parry Sound and immediately north of the area mapped by Ted Bright (Geologist, Precambrian Geology Section, Ontario Geological Survey) in 1986. This year's mapping was the second of three map sheets planned for the area.

Phil Kor (Geologist, Engineering and Terrain Geology Section, Ontario Geological Survey) completed the second year of a three-year Quaternary mapping project in the Parry Sound area. The Orrville, Magnetawan, Pointe au Baril Station, Naiscoot River, and Key Harbour National Topographic System (NTS) sheets were mapped in detail.

Greg Jones and Mary Gauvreau (Jones, Cameron, and Szoke 1987) of the Aggregate Assessment Office, undertook an aggregate assessment of the Highway 69 corridor in the area from south of Parry Sound, north to the French River. The purpose of this study was to delineate and determine the quality and quantity of aggregate within the area, both for road building and general construction.

Geoff Meadows and Chris Fouts (Resource Geologists, Industrial Minerals Section, Ministry of Northern Development and Mines, Toronto) carried out an evaluation of the flagstone potential of the Muskoka–Parry Sound area. Plans are to publish the results of this work in the spring of 1988.

EXPLORATION ACTIVITY

As of December 10, 1987, a total of 93 claims were recorded in the Algonquin District.

Exploration activity related to interests in graphite, silica, building stone, gold, base metals, precious metals, gemstones, rare earths and platinum, as shown in Figure 14.1 and Tables 14.1 and 14.2.

GRAPHITE

There are two graphite occurrences in the Central Gneiss Belt that are currently undergoing active exploration programs: Princeton Resources Corporation's property in Maria Township, and Cal Graphite Corporation's property in Butt Township. A property in Laurier Township is in the process of being optioned and there are several companies actively looking at graphite in the area.

A graphite mine in Ontario is a step closer to becoming a reality with Cal Graphite Corporation's announcement on October 8, 1987, of a formal decision to bring its Graphite Lake Property into production in the fall of 1988 (Cal Graphite Corporation news release, October 8, 1987; Assessment Files, Resident Geologist's Office, Dorset). The company's engineers and consultants are actively engaged in the work necessary to bring the property into production, including the process of obtaining all govern-

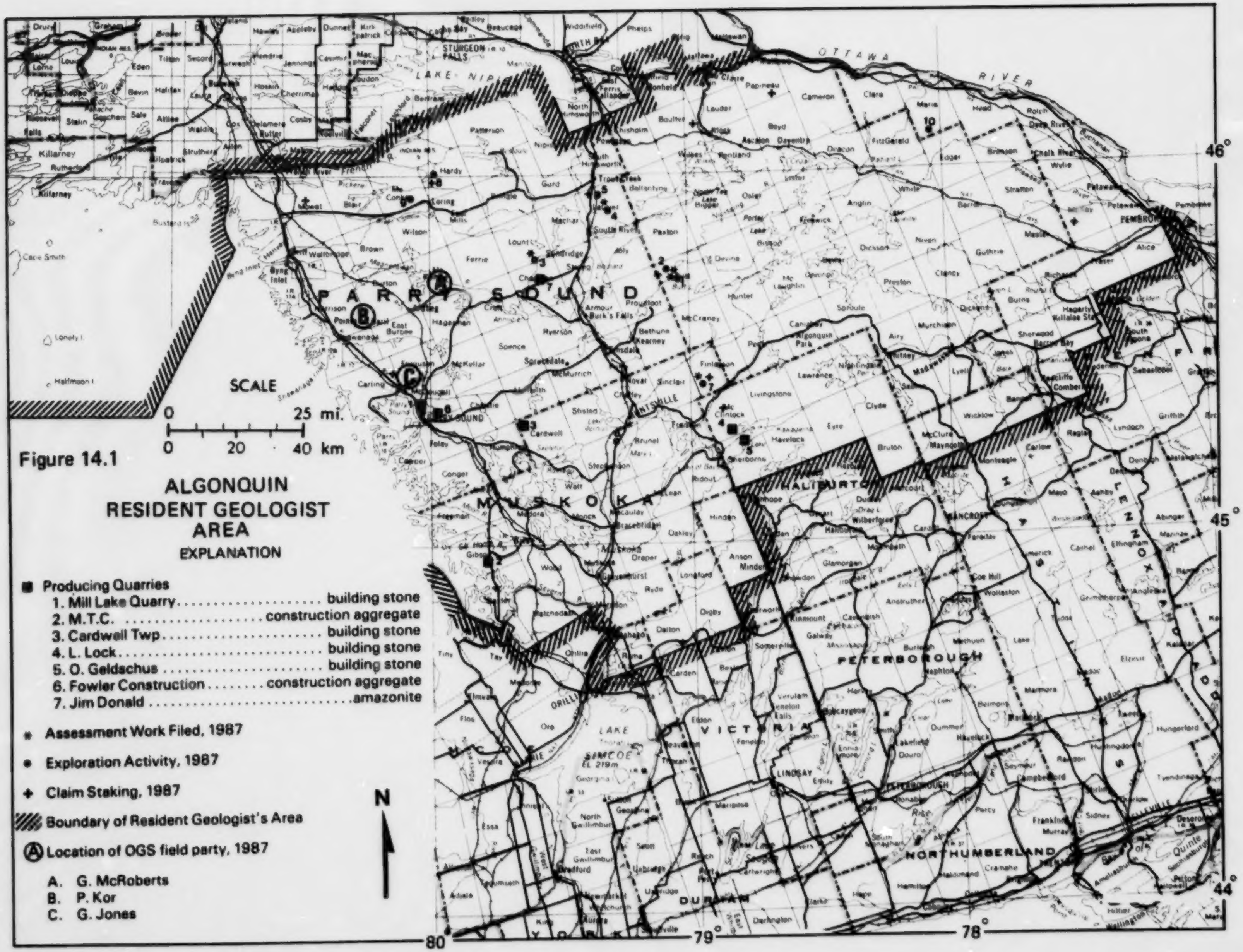

Figure 14.1

ALGONQUIN RESIDENT GEOLOGIST AREA

EXPLANATION

■ Producing Quarries
1. Mill Lake Quarry.................... building stone
2. M.T.C. .... construction aggregate
3. Cardwell Twp.................... building stone
4. L. Lock.................... building stone
5. O. Geldschus .... building stone
6. Fowler Construction.......... construction aggregate
7. Jim Donald ....amazonite
* Assessment Work Filed, 1987
● Exploration Activity, 1987
+ Claim Staking, 1987
▨ Boundary of Resident Geologist's Area
Ⓐ Location of OGS field party, 1987
A. G. McRoberts
B. P. Kor
C. G. Jones
SCALE
0
25 mi.
0
20
40 km
N
46°
45°
44°
80°
79°
78°
OTTAWA RIVER
LAKE NIPISSING
STURGEON FALLS
PARRY SOUND
MUSKOKA
HALIBURTON
PETERBOROUGH
VICTORIA
NORTHUMBERLAND
DURHAM
YORK
LENNOX
LAKE SIMCOE
PEMBROKE

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 14.1

Number on Figure	Individual or Company	Activity
1.	Cal Graphite Corp.	Pre-development work; Butt Township
2.	Swayze Resources	Geology, trenching, geophysics; Butt Township
3.	Jones, E.T.	Trenching, prospecting; Lount Township
4.	Rantala, E.J.	Prospecting; Laurier Township
5.	Manella, B.	Prospecting; Laurier Township
6.	Irwin, W.	Prospecting; Stephenson Township
7.	Monte Carlo Gold Mines	Geophysics; Finlayson Township
8.	Lacana	Geophysics; Hardy
9.	Noramco Explorations Inc.	Geology; McConkey Township
10.	Princeton Resources	Pre-feasibility study; Maria Township

ment approvals. Geocon Incorporated has been engaged to carry out a significant amount of this work.

The following is a point-form summary of some of the company's highlights of 1987:

1. The announcement of a formal production decision.
2. The continued work by the consultants on the final engineering and design work of the open pit, mill, etc., as well as environmental studies.
3. The continued work of Amalgamet Canada Limited as the exclusive agent responsible for marketing the Company's products on a world-wide basis.
4. The continued work on bulk-tonnage testing of Cal Graphite Corporation's graphite-bearing rock at the Quebec Government owned Mineral Research Centre in Quebec City (Cal Graphite Corporation news release, August 10, 1987; Assessment Files, Resident Geologist's Office, Dorset). Results to August 10 were encouraging, with a vertical-column flotation system producing a one-to-one rough concentrate which recovered 99.98 percent of the graphite flake. Final processing of the rough flake produced a concentrate with 50 percent of the flake being +48 mesh, and a graphitic carbon content of 97 percent. It is hoped that additional work will upgrade the flake carbon content to 99 percent.
5. The announcement of a planned $1.1 million exploration program to increase its current 29 million tons of reserves (Cal Graphite Corporation news release, October 8, 1987; Assessment Files, Resident Geologist's Office, Dorset).

Princeton Resources Corporation and Northcoast Exploration Limited, both Vancouver-based companies, are currently involved in a joint venture exploration program on their Maria Township graphite deposit. Full details involving the exploration history of the deposit can be found in Open File Report 5649 (Garland 1987). Preliminary drilling indicated reserves in Zone B of the deposit at 14 million tons; these will be tested by more intensive drilling. An additional six to eight million tons are inferred from geology. Two new zones have been discovered south of the original pits. An average graphite grade for the deposit is 3.5 weight-percent graphite.

Two bulk samples, approximately 1800 tons each, have been processed by the company mill. The graphite was separated by Denver standard flotation cells and the concentrate run through several stages of cleaner cells. Recovery varies from 78 to 85 weight-percent graphite. The 35 to 80 mesh concentrate has carbon contents between 90 and 95 per cent. Finer mesh concentrate has carbon contents between 87 and 90 per cent. Test results were duplicated at Lakefield Laboratories.

The two companies have prepared a market study, concentrating on markets in North America and the Federal Republic of Germany, with samples of concentrate being sent to various prospective buyers. Kilborn Associates (Dave Copeland, geological consultant to Princeton Resources Coproration, personal communication, 1987) are under contract to provide environmental assessment studies for the deposit area. Princeton Resources Corporation and Northcoast Exploration Limited are in the process of preparing a prefeasibility study, and expect to have a completed feasibility study by the spring of 1988.

GOLD

Limited exploration for gold, mainly by local prospectors, continued in the Huntsville–Parry Sound area. Additional work is planned for 1987 and 1988 on a property in Finlayson and Sinclair Townships, 30 km northeast of Huntsville, that was staked by Canadian Gold Resources Incorporated late in 1985.

STONE

Some interest in building stone was shown in 1987. Inquiries concentrated on potential sources of red or black "granite" suitable for interior or exterior facing. There was also some interest expressed in flagstone, as there are already several producing quarries within the area.

PLATINUM

Two mafic bodies, located in the area south of Lake Nipissing, were examined for their platinum potential. Results to date have proven inconclusive.

TABLE 14.2 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Assess - Assessment Work
DDH - Diamond Drilling (Number-Footage)
VLF - Very Low Frequency Electromagnetic Survey
EM - Electromagnetic Survey
Mag - Magnetic Survey
Tr - Trenching
STr - Stripping

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Muskoka Dist. Finlayson Twp.	31E/7	M. Clarke	Gold	Assess	VLF	Mar./86	86-96	Finlayson 2
Muskoka Dist. Finlayson Twp.	31E/7	P. Rodman	Gold	Assess	VLF, Mag	1987	87-64	Finlayson 3
Muskoka Dist. Finlayson Twp.	31E/7	Daimler Resources Inc.	Gold	Assess	EM, Mag	1987	87-39	Finlayson 4
Muskoka Dist. Finlayson Twp.	31E/7	Daimler Resources Inc.	Gold	Assess	EM, Mag	1987	87-40	Finlayson 5
Muskoka Dist. Finlayson Twp.	31E/7	Canadian Gold Resources	Gold	Assess	VLF, Mag	1987	87-41	Finlayson 6
Muskoka Dist. Finlayson Twp.	31E/7	Canadian Gold Resources	Gold	Assess	VLF, Mag	1987	87-42	Finlayson 7
Muskoka Dist. Finlayson Twp.	31E/7	D. Markle	Gold	Assess	VLF, Mag	1987		Finlayson 8
Nipissing Dist. Butt Twp.	31E/11	Swayze Resources	Graphite	Assess	Assays	Oct./86	87-3	Butt 23
Nipissing Dist. Butt Twp.	31E/11	Swayze Resources	Graphite	Assess	Tr.	Oct./86	87-2	Butt 24
Nipissing Dist. Butt Twp.	31E/11	Swayze Resources	Graphite	Assess	Geology	July/87	87-69	Butt 25
Nipissing Dist. Butt Twp.	31E/11	Swayze Resources	Graphite	Assess	Geology, EM,VLF	Aug./86	87-22	Butt 26
Nipissing Dist. Butt Twp.	31E/11	Cal Graphite	Graphite	Assess	DDH (3-1211')	July/87	87-38	Butt 27
Nipissing Dist. Butt Twp.	31E/11	Cal Graphite	Graphite	Assess	STr.	Aug./86	87-15	Butt 28
Parry Sound Dist. Laurier Twp.	31E/14	E.J. Rantala	Gold	Assess	Tr.	Nov./86	86-101	Laurier 13
Parry Sound Dist. Lount Twp.	31E/12	E.T. Jones	Gold	Assess	Tr, STr.	1987	87-56	Lount 19

MINING ACTIVITY

Numerous quarries, most notably the Mill Lake Quarry at Parry Sound, produced flagstone for use primarily as a building stone. The Mill Lake Quarry produces several products including a very attractive one-half inch flagstone that is easily installed on interior walls.

An amazonite quarry in Chapman Township, northeast of Magnetawan, continued operation as a commercial mineral collecting site. There is also a substantial deposit of garnets on the property, which the owner opened up in 1986 as a mineral collecting site. Tourists are transported to the quarry in a horse-drawn wagon.

MINERAL EDUCATION PROGRAM

During the year, regional geological staff visited three Provincial Parks—Killbear (2 visits), Grundy (2 visits), and Arrowhead—to give an introductory talk on minerals and geology, followed by field trips within these parks. One of the sessions at Killbear was attended by over 425 people, a testament to the public interest in geology. One session was given at the Leslie M. Frost Natural Resources Centre during the summer of 1987. Sessions on geology, minerals, and employment in the field of geology were given to several schools in the area.

RECOMMENDATIONS

As a direct result of the Canada–Ontario Mineral Development Agreement, the geological database for parts of the Central Gneiss Belt will be significantly increased. This work should be monitored for results that could give us a better understanding of the potential for selected industrial minerals and rare earth elements.

Results of a new project initiated by Mary Garland, that will attempt to evaluate the platinum group element and precious metal potential of the Parry Sound–Nipissing area, should be monitored over the next two years. The presence of gold and the reported presence of platinum in the area are a good indication that the results of this project will be interesting.

It is felt that this area has, in general, good potential for selected industrial minerals, platinum group elements, and precious metals. As mentioned previously, people interested in this area should continually monitor the work being conducted by both the Resident Geologist's Office and the Ontario Geological Survey.

RECENT PUBLICATIONS

Bright, E.G., and assistants
1987: Precambrian Geology of the Whitestone Lake Area, Parry Sound District; Ontario Geological Survey, Map P.3095, Geological Series-Preliminary Map, scale 1:15 840 or 1 inch to 1/4 mile.

Easton, R.M.
1987: 1:50 000 Geological Compilation of the Minden Area (NTS 31D/15); Ontario Geological Survey, Open File Map 95, 1 map, scale 1:50 000.

Fogg, C.T., and Boyle, E.H.
1987: Flake and High-Crystalline Graphite Availability—Market Economy Countries; A Minerals Availability Appraisal, United States Department of the Interior, Bureau of Mines Information Circular 9122, 40p.

Grant, W.G., and Owsiacki, L.
1987: An Evaluation of the Lake Timiskaming Paleozoic Outlier for Potentially Exploitable Limestone and Dolostone Deposits; Ontario Geological Survey, Open File Report 5661, 153p., 24 figures, 5 tables, 4 appendices, and Map P.3101 in back pocket.

Needham, T.W.
1987: Geological Setting of Two Metagabbroic Bodies, Central Britt Domain, Southwestern Grenville Province, Ontario; p.597-604 *in* Current Research, Part A, Geological Survey of Canada. Paper 87-1A, 946p.

Villard, D.J., Garland, M.I., and Marmont, C.
1987: Huntsville Resident Geologists's Area, Algonquin Region; p.274-279 *in* Report of Activities 1986, Regional and Resident Geologists, edited by C.R. Kustra. Ontario Geological Survey, Miscellaneous Paper 134, 322p.

Wilson, G.C., and Garland, M.I.
1987: Instrumental Neutron Activation Analysis; Isotrace Laboratory Report, Isotrace Laboratory, University of Toronto, 8p.

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Garland, M.I.
1987: Graphite in the Central Gneiss Belt of the Grenville Province of Ontario; Ontario Geological Survey, Open File Report 5649, 222p., 33 figures, 5 tables, 13 photographs, and 6 maps in back pocket.

Jones, G.R., Cameron, C.J., and Szoke, S.
1987: Aggregate Resources Inventory of the Parry Sound to French River Area, Southern Ontario; Ontario Geological Survey, Open File Map 101, 1 map, scale 1:150 000.

Marmont, C.
1986: Industrial Minerals and Rare Earth Element Deposits in the Muskoka--Parry Sound–Nipissing Area: p.331-334 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p. Accompanied by 1 chart.
1987: The Suitability of Marbles (Limestones) in the Parry Sound Area for Agricultural Applications; Ontario Geological Survey, Open File Map 72 with accompanying notes, 6p., 3 tables, and 3 figures.

Marmont, C., and Johnston, M.
1987: Mineral Deposits Studies in the Huntsville–Parry–Sound–Powassan Area—A Progress Study; Ontario Geological Survey, Open File Report 5647, 271p., 9 tables, 30 figures, 12 photos, and 5 charts in back pocket.

McRoberts, G., and Tremblay, L.
1987: Geology of the Ferrie River Area, District of Parry Sound; Ontario Geological Survey, Open File Map 98, 1 map, scale 1:15 840 or 1 inch to 1/4 mile.

15. Southeastern Resident Geologist's Area—1987

P.W. Kingston[1], S. van Haaften[2], V.C. Papertzian[3], W.T. Grant[4], L.G.D. Thompson[5], D.A. Williams[6], and A. MacKinnon[6]

[1]Resident Geologist, Ministry of Northern Development and Mines, Tweed

[2]Staff Geologist, Ministry of Northern Development and Mines, Tweed

[3]Drill Core Library Geologist, Ministry of Northern Development and Mines, Tweed

[4]Drill Core Library Geologist, Ministry of Northern Development and Mines, Bancroft

[5]Staff Geophysicist, Southeastern Resident Geologist's Area, Ministry of Northern Development and Mines, Tweed

[6]Contract Geologist, Ministry of Northern Development and Mines, Tweed

INTRODUCTION

During 1987, exploration for industrial minerals and precious metals was the main activity of mining companies, prospectors, staff of the Resident Geologist's Office and of the Ontario Geological Survey (OGS) working in this area. The emphasis was on gold, graphite, talc, and wollastonite.

The Resident Geologist's service area was expanded, with 80 new townships added in February 1987. Assessment files and other information are now maintained in Tweed for 200 townships. The Resident Geologist supervises drill core libraries in the Villages of Bancroft and Tweed, which together serve the mineral exploration industry for all of Southern Ontario.

The Resident Geologist's Office is staffed by P.W. Kingston, Resident Geologist; L.G.D. Thompson, Geophysicist; S. van Haaften, Staff Geologist; V.C. Papertzian, Drill Core Library Geologist in Tweed; W. Grant, Drill Core Library Geologist in Bancroft; and C.M. Cassidy, Secretary. D.A. Williams, A. MacKinnon, and P. LeBaron were contract Geologists for the Canada-Ontario Mineral Development Agreement (COMDA), which is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario. D. Burley was contract Mines Clerk, and D. Stewart worked on contract as Geophysical Assistant.

Six summer students were employed under Experience '87.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist provided a consultive technical service to companies and individuals engaged in mineral exploration and mining development in Southeastern Ontario. This service involved consultations in the office and in the field, and use of the Resident Geologist's library, files, and computer systems. The drill core libraries were also extensively used by the Resident Geologist's clientele.

The Resident Geologist served on two committees during 1987: the Information Management Subcommittee, and the Information Technology Subcommittee. These committees dealt mainly with the implementation of computer technology and information management systems throughout the Ontario Ministry of Northern Development and Mines (MNDM).

Selected mineral properties were visited, either because of their importance to Ministry programs, or because of interest in, or work by, mining and exploration companies. Emphasis was placed on carefully examining properties under development, especially industrial mineral properties. Some mineral areas were visited by the Staff Geologist as part of the Ministry's land use planning activities.

COMDA-funded projects carried out from the Resident Geologist's Offices were building stone, refractory minerals, industrial minerals, and part of the Madoc Unconformity Study. Much of the Resident Geologist's time was spent in co-ordination and technical supervision of these projects.

The Geophysicist completed many seismic, resistivity, conductivity, magnetic, and radiometric surveys. These surveys supported both the MNDM-COMDA Madoc Unconformity Project, and the blending sand, buried aggregates, and sensitive clay studies undertaken by the Ministry of Natural Resources (MNR).

One Special Employment Program (SEP), part of the Mining Sector Work Program, was managed, in 1987, by the Resident Geologist and his staff. The Crowe Valley Conservation Authority sponsored the project, which ran from February to August. The 68 workweeks of employment generated by the project were used by four program participants. SEP activities which were completed include the following:

1. Organizing the Resident Geologist's collection of books and journals.
2. Preparing 120 samples from eight building stone blocks for A.S.T.M. (American Society for Testing and Materials) tests. The resulting pieces of cut stone were sent to the Canadian Centre for Mineral and Energy Technology (CANMET), Energy, Mines, and Resources Canada, for testing.
3. The redrafting of 19 old, faded mine plans.

A field trip was held in the Tweed area for Resident Geologist's staff and the Ontario Geological Survey in September. The field trip focussed on gold and wollastonite deposits in Madoc and Marmora Townships, and on the Precambrian–Paleozoic unconformity.

The Resident Geologist or his staff attended the following meetings in 1987:

1. Geological Survey of Canada Open House, Ottawa, January
2. Prospectors and Developers Association Annual Meeting, Toronto, March

3. International Building Stone Producers' meeting in Atlanta, Georgia, April
4. MAGNEC neotectonics field trip in the Kingston–Belleville–Prince Edward County area in October (D.A. Williams of the Resident Geologist's staff was a guide on this field trip)
5. Ontario Geological Survey Open House, Toronto, December

CLIENT SERVICES

The Resident Geologist's Office began selling prospector's licences and claim tags in October 1987. Many Ontario Geological Survey (OGS) publications which relate to the Southeastern Resident Geologist's Area are stocked for over-the-counter sale.

Much of the geological information service is provided by the Staff Geologist. Tweed's reference collection of reports, maps, and files was reorganized in 1987, and office visitors can now use the following:

1. assessment files for all of the Southeastern Resident Geologist's Area
2. mineral deposits files
3. a nearly complete collection of OGS reports and maps for Southeastern Resident Geologist's Area (microfiche copies of almost all OGS reports are available for office use)

The library materials, mineral deposits files, and assessment files have been indexed using a microcomputer. The main indexing tool used was dBase III PLUS[a] software, and some office visitors regularly use the "Tweedmin" mineral deposits program which was written in dBase III Plus.

The collection of scientific papers is being organized using Inmagic[b] text retrieval software. Text retrieval software appears to be especially useful for geological data handling, and some large dBase III PLUS files will be converted to Inmagic in the next year.

MINERALS EDUCATION PROGRAM

The Southeastern Resident Geologist each year provides on request, a limited number of geology and mining-related talks and field trips to schools, Provincial Parks, and Junior Ranger Camps. The Resident Geologist also puts on displays at two gem and lapidary shows. H. Meyn, Ministry of Northern Development and Mines (Regional Minerals Specialist) Bancroft; and K. Fell and B. Goad of the Specialist's staff; together with W. Grant and S. van Haaften of the Resident Geologist's staff; implemented the program in 1987.

Geology talks and slide shows were given at two Junior Ranger Camps and at Silent Lake Provincial Park. A talk, slide show, and field trip were provided to a group of earth science teachers from Michigan, and a field trip was put on for the Grade 13 geography class of Belleville Collegiate Institute.

Booths were set up at the Bancroft Gemboree and the Wilberforce Rockhound Fair at which mineral and geologically oriented publications, issued by the Ministry of Northern Development and Mines, were on sale. The Ministry of Northern Development and Mines sponsored D.H. Gorman, Professor of Mineralogy, University of Toronto, at these two events to identify rocks and minerals for the rockhounds.

DRILL CORE LIBRARIES

TWEED DRILL CORE LIBRARY

by V.C. Papertzian

The drill core library was managed by V.C. Papertzian in 1987. Mike Marshall acted as assistant in July and August as part of the Experience '87 program.

The following resources and services are offered at the Tweed Drill Core Library:

1. drill core from Southern Ontario
2. facilities for logging and splitting core
3. binocular and petrographic microscopes
4. rock cutting and polishing equipment
5. level and section plans from past producing mines in the area
6. Eastern Ontario mineral deposits and building stone database searches on a microcomputer
7. searches of the Ontario Mineral Deposits Inventory database

As of December 1, 1987, 75 603 m of drill core were in the drill core library catalogue, and approximately 300 m of recently acquired core had yet to be catalogued. Table 15.1 summarizes the library's holdings. During 1987, 9541 m of core were catalogued.

Major contributors of drill core this year were Mono Gold Mines Incorporated, from their property immediately north of Bannockburn; and E B Explorations Incorporated, from the old Addington property near Flinton, Ontario.

There were a total of 128 visitors to the facility between January 1, 1987, and December 1, 1987.

BANCROFT DRILL CORE LIBRARY

by W.T. Grant

The Drill Core Library in Bancroft was staffed full time by W.T. Grant. Anne Casselman worked as an assistant from May through August as part of the Experience '87 program. A Canada–Ontario Unemployment Insurance Section 38 Job Creation Program project, employing four persons to compile Geological Data Inventory Folios (GDIF) for nine townships in the Bancroft area, was completed in June.

The administration of the Bancroft Drill Core Library has been transferred from the Bancroft Resident Geologist (now Regional Minerals Specialist) to the Resident Geologist in Tweed.

The same services (as those offered at the Tweed Drill Core Library) are offered at the Bancroft Drill Core Library, with the following exceptions. Assessment files pertaining to drillholes in townships within the Tweed Resident Geologist's Area are kept on file in Tweed. Assessment files pertaining to drillholes in townships within the Huntsville Resident Geologist's Area are kept on file in Huntsville. Arrangements may be made through the Drill Core Library to

SUMMARY OF TWEED CORE LIBRARY HOLDINGS
DECEMBER 1, 1987

TABLE 15.1

TOWNSHIP	COMPANY	DEPTH DRILLED (M)	CORE STORED (M)	COMMODITY SOUGHT
ANGLESEA	ULTIMATE ENERGY RES.	398.6	256.7	Au
BARRIE	GRANDAD RESOURCES	913.8	894.8	Au+
BARRIE	HENRY COOK PROPERTY	76.2	76.2	Pb,Zn,Ag,Au
BELMONT	BLAIRTON IRON MINE	1,460.4	1,202.4	Fe
BELMONT	CORDOVA	2,875.3	2,489.6	Au
BELMONT	PERSHING IRON MINE	6,712.3	5,718.4	Fe
BELMONT	PREUSSAG	1,211.9	1,133.7	CaCO
CAMDEN EAST	ROBLINDALE QUARRY	17.0	16.8	Scientific
CHARLOTTENVILLE	OLIVER IRON MINING	5,290.4	1,891.5	Fe
CLARENDON	SELCO INC.	245.4	232.0	Zn
CLARENDON	ST. JOE'S EXPL. LTD.	905.0	905.0	Zn
ELZEVIR	STEEPROCK	516.2	492.0	Talc
ERNESTOWN	BETHLEHEM STEEL CORP	185.9	185.9	Fe
HOPE	ONTARIO HYDRO	4,453.6	1,822.6	Engineering
HUNGERFORD	RAM PETROLEUMS LTD	157.9	157.9	Mica
KALADAR	C.R. YOUNG	153.3	126.9	Mica
KALADAR	E&B EXPLORATIONS INC	7,817.7	7,817.7	Au
KALADAR	J. BYERS	123.1	121.2	Feldspar
KALADAR	LACANA MINING CORP.	176.5	131.9	Mica
LANARK	SELCO CLYDE RIVER	1,448.3	1,267.4	Zn
MADOC	BANNOCKBURN MINE	260.6	177.8	Au
MADOC	FREEPORT EXPLORATION	3,192.6	2,244.3	Base Metals
MADOC	MONO GOLD MINES INC.	14,924.9	14,849.7	Au
MADOC	SAGER	1,562.3	1,330.1	Base Metals
MADOC	SSFC/OGS	107.3	107.3	Scientific
MADOC	SYNGENORE	3,438.4	2,388.8	Base Metals
MADOC	TWIN BUTTES	736.0	736.0	Talc
MARMORA	ACKERMAN	37.1	37.0	Au
MARMORA	BELMAR RESOURCES INC	374.1	361.0	Au
MARMORA	BETHLEHEM STEEL CORP	8,706.5	478.8	Fe
MARMORA	GOLD BROOKE EXPL.	795.0	810.9	Au
MARMORA	MARMORATON IRON MINE	4,080.5	3,602.5	Fe
METHUEN	PREUSSAG	190.6	175.7	CaCO
N. ELMSLEY	GLOBE GRAPHITE	880.6	670.5	Graphite
NORTH BURGESS	O.M.N.R.	51.6	51.6	Vermiculite
NORTH CROSBY	MTC WESTPORT DDH	32.0	32.0	Engineering
OLDEN	LYNX CANADA EXPL.	15,825.8	14,711.5	Zn
OPS	OGS/SSFC	155.1	149.3	Scientific
ORILLIA	SPARROW LAKE	18.0	16.9	Limestone
PALMERSTON	FAIRFIELD PROJECTS	152.4	146.8	U
RAMSAY	J.M. BELL	665.4	665.4	Base Metals
SEYMOUR	ALLAN'S MILLS	3,530.8	3,170.1	Fe
SOMMERVILLE	MASON PROPERTY	31.7	5.2	Limestone
SOMMERVILLE	OGS/SSFC	28.0	28.0	Scientific
SOUTH FREDRICKSBURG	LENNOX GENERAT. STN.	107.5	107.5	Engineering
TUDOR	WOLFEX EXPL. LTD.	75.8	75.8	Au,Ag
TYENDINAGA	ONTARIO HYDRO	207.4	159.7	Engineering
VARIOUS	ONTARIO HYDRO	1,396.1	779.5	Engineering
WENTWORTH PQ	BLACK GREGOR EXPL.	84.4	83.1	Graphite
WOODHOUSE	OLIVER IRON MINING	1,540.5	509.1	Fe
TOTAL		98,326.7	75,603.6	

SUMMARY OF BANCROFT CORE LIBRARY HOLDINGS
DECEMBER 1, 1987

TABLE 15.2

TOWNSHIP	COMPANY	DEPTH DRILLED (M)	CORE STORED (M)	COMMODITY SOUGHT
ANSTRUTHER	BIRON BAY RESOURCES LTD.	2,600.8	2,600.8	Fe,Ti
	ESSO MINERALS CANADA	1,008.0	972.2	U,Th
	GLENN EXPLORATIONS	181.4	2.7	U,Th
	NORTHGATE EXPLORATION LTD.	384.3	339.0	U,Mo
BLITHFIELD	ONTARIO HYDRO	158.1	127.5	Structure
BROUGHAM	CORONATION RESOURCES	529.1	302.7	Graphite
	ONTARIO HYDRO	204.9	98.8	Structure
BURLEIGH	L.V. LOMAS CHEMICAL COMPANY LTD.	229.3	2.4	Marble
BUTT	VESUVIUS CRUCIBLES	1,248.3	1,149.0	Graphite
CARDIFF	ESSO MINERALS CANADA	3,558.1	3,019.1	U,Th
	GRIFFIS, A.T.	294.4	3.8	Graphite
	KENMAC CHIBOUGAMAU MINES LTD.	691.3	396.2	U,Th
	KERR ADDISON MINES LTD.	10,478.6	9,691.3	U,Th
CASHEL	DAVID MCMURRAY	292.5	286.6	Talc
CAVENDISH	QUEBEC URANIUM MINES LTD.	459.5	6.1	U
DUNGANNON	JAYFRAN ENTERPRISES	367.6	367.6	Neph Syen
FARADAY	MADAWASKA MINES	3,234.3	632.6	U,Th
	MERCIER EXPLORATION	735.3	10.7	U,Th
GALWAY	HALAS, FRANK	457.4	4.6	U
GLANMORGAN	ESSO MINERALS CANADA	943.1	732.0	U,Th
	SULPETRO MINERALS LTD.	373.7	373.7	Zn
LAURIER	TROUT CREEK	162.1	79.2	Graphite
LIMERICK	LAC MINERALS LTD.	13,281.6	9,295.9	Cu,Ni,Co
MAYO	FALCONBRIDGE LTD.	421.6	421.6	Fe
METHUEN	INDUSMIN LTD.	92.2	92.2	Neph Syen
MONMOUTH	ESSO MINERALS CANADA	5,321.9	4,429.9	U
MONTEAGLE	ESSO MINERALS CANADA	192.8	177.7	U
	FOREFRONT URANIUM MINES LTD.	609.8	205.2	U
	HOBBS, L.G.	220.8	1.6	U
MURCHISON	COMET QUARTZ	102.6	86.2	Qtz
RYERSON	GRAPHITE CORPORATION OF CANADA LTD.	1,338.0	1,299.5	Graphite
	RYERSON GRAPHITE	1,113.0	1,044.8	Graphite
SNOWDON	SULPETRO MINERALS LTD.	11,612.0	11,600.2	Zn
TOTAL		62,898.4	49,853.7	

acquire assessment files for the client's use in Bancroft.

The drill core library's holdings are summarized in Table 15.2.

EXPLORATION ACTIVITY

In 1987, approximately 464 new claims were recorded in the Southeastern Resident Geologist's Area by December 8. Figure 15.1 shows the locations of claims staked and assessment work which was received during 1987. Table 15.3 summarizes assessment work and other information which was received by the Resident Geologist's Office.

Exploration was at a very high level during 1987. Direct exploration and development expenditures in the Resident Geologist's Area, for 1986 and 1987, were estimated to total at least $3 000 000. By comparison, expenditures for the five years beginning with 1981, and running through to 1985, were estimated to total about $3 500 000.

Although much exploration work in Southern Ontario is carried out on private land, and companies are not obligated to report this work to the Ministry of Northern Development and Mines, it was possible to list 37 currently active exploration ventures (Table 15.4). Commodities for which exploration or development are being carried out include calcite, gold, granite, graphite, lead, marble, mica, roofing granules, silica, silver, talc, vermiculite, wollastonite, and zinc.

I.K.O. Industries Limited are planning to open a roofing granules mine and processing plant at Madoc. The company has applied for a quarry licence under the Pits and Quarries Control Act.

Mono Gold Mines Incorporated will spend an additional $2 000 000 on their gold deposit, in Madoc Township, in a joint venture with Micham Exploration Incorporated, a member of the Corona Group. The Company stripped and washed 20 acres in 1987, in addition to doing more diamond drilling. Total diamond drilling, from 1985 to 1987, on this deposit was about 49 000 feet distributed over 153 holes. Either a shaft or decline is planned for 1988. The underground development will be carried out by MacIsaac Mining and Tunneling Company of Sudbury.

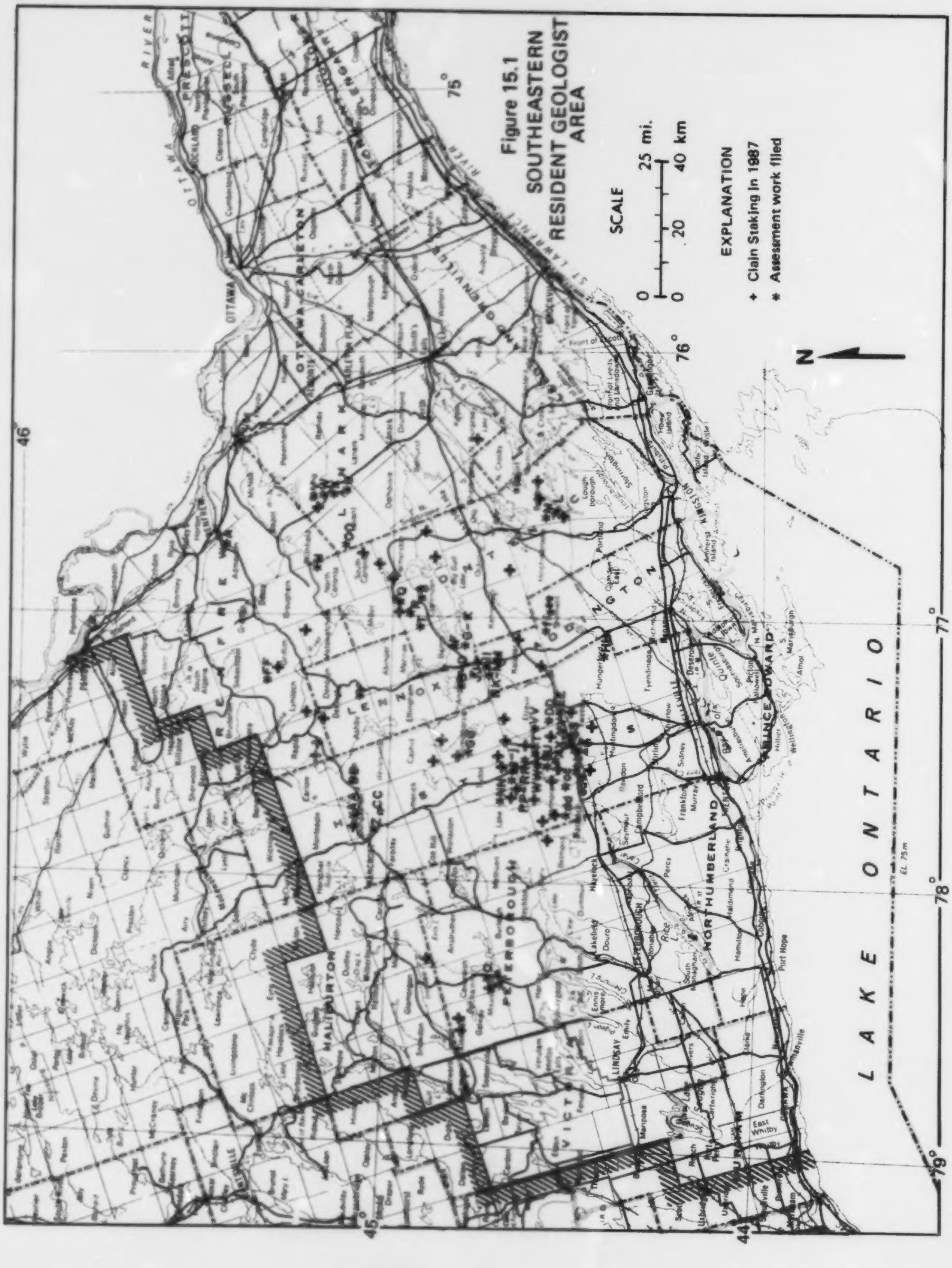
SCALE
0
20
25 mi.
0
20
40 km
N
46
45°
44
75°
76°
77°
78°
79°
LAKE ONTARIO
OTTAWA RIVER
ST LAWRENCE RIVER
OTTAWA
KINGSTON
BROCKVILLE
LINDSAY
PETERBOROUGH
HALIBURTON
NORTHUMBERLAND
PRINCE EDWARD
VICTORIA
DURHAM
OTTAWA-CARLETON
LANARK
RENFREW
PRESCOTT
STORMONT
GLENGARRY
FRONTENAC
LENNOX AND ADDINGTON
HASTINGS
LEEDS AND GRENVILLE
EL 75m

Figure 15.1
SOUTHEASTERN
RESIDENT GEOLOGIST
AREA

EXPLANATION

+ Clain Staking in 1987
* Assesment work filed

TABLE 15.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SOUTHEASTERN DISTRICT
ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES 1987

DD - Diamond Drilling (where shown, the number following "DD" indicates the number of holes drilled and the total length drilled respectively)
EM - Electromagnetic Survey
GEOCHEM - Geochemical Survey
GL - Geological Survey or Report
IP - Induced Potential Survey
RAD - Radiometric Survey
SP - Self Potential Survey
STR - Stripping
VLF-EM - Very Low Frequency Electromagnetic Survey

AG - Silver
AU - Gold
CU - Copper
FE - Iron
PB - Lead
SB - Antimony
ZN - Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ADMASTON (A)	31F/7	SULPETRO MINERALS LIMITED	ZN,PB	ASSESS	DD17-19,154FT	1985	63.4646	ADN003
ANGLESEA (B)	31C/14SE	C.L. EMERY	AU	ASSESS	MANUAL WORK	1986		ANA011
ANGLESEA (C)	31C/14SE	C.L. EMERY	AU	ASSESS	POWER STR	1986		ANA012
ANGLESEA (D)	31C/14SE	STEPHEN J. BARTLETT	AU	ASSESS	EM	1987		ANA013
BAGOT	31F/7	ROY G. NEWLIAN		ASSESS	AIR RAD. SURVEY	1978		BAT011
BARRIE (F)	31C/14SE	WAYNE JOHNSON	AU	ASSESS	DD1-104FT	1986		BAE076
BARRIE (G)	31C/14SE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOLOGY, GEOCHEM	1987	2.10333	BAE077
BARRIE (H)	31C/14SE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOLOGY	1987	2.10333	BAE078
BARRIE (I)	31C/14SE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987	2.10333	BAE079
BARRIE (J)	31C/14SE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987	2.10333	BAE080
BARRIE (K)	31C/14SE	STEPHEN J. BARTLETT	AU,ZN	ASSESS	GEOCHEM	1986		BAE081
BEDFORD (L)	31C/10SE	STEWART LAKE RESOURCES INC	GRAPHITE	ASSESS	VLF-EM	1987	2.10236	BED018
BEDFORD (M)	31C/10SE	GRENVILLE EXPLORATION SERVICES	SILICA, FELDSPAR	ASSESS	GEOLOGY	1986	2.10342	BED019
BLITHFIELD N. CANONTO (N)	31F/2	N. AXIETIS		ASSESS	EM	1980		BLD022, NCO010
CAVENDISH (O)	31D/16SW	JOHN P. RAPSKI		ASSESS	MANUAL WORK	1980		CAH084
CAVENDISH (P)	31D/9NW	ALBERT J. CONNALLY		ASSESS	MANUAL WORK	1980		CAH085
CLARENDON (Q)	31C/15	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOLOGY, GEOCHEM	1987	2.10209	CLN023
CLARENDON (R)	31C/15NW	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987	2.10489	CLN024
CLARENDON (S)	31C/15NW	CLARIDGE LAROSE GEOPHYSICS LTD.	AU	ASSESS	IP, RESISTIVITY	1987	2.10512	CLN025
CLARENDON (T)	31C/15NW	CLARIDGE LAROSE GEOPHYSICS LTD.	AU	ASSESS	MAGNETICS VLF-EM	1986	2.9710	CLN026
DARLING (U)	31F/2NE	M. DIGIROLAMO	MARBLE BUILDING STONE	ASSESS	DD1-180FT	1986		DAG033
DARLING (V)	31F/2NE	KINBAURI GOLD CORP	AU	ASSESS	GEOLOGY	1987	2.9740	DAG034
DARLING (W)	31F/2NE	KINBAURI GOLD CORP	AU	ASSESS	SP, GL	1987	2.9830	DAG035
DARLING (X)	31F/2NE	STEEP ROCK RESOURCES INC	CALCITE	ASSESS	DD2-993FT	1987		DAG036
DENBIGH (Y)	31F/3SW	RUSSELL J. CRAWFORD	AU	ASSESS	SAMPLING	1987	2.9637	DEH003
DUNGANNON (Z)	31F/4SW	M. DIGIROLAMO	GRANITE BUILDING STONE	ASSESS	DD1-120FT	1986		DUN025
DUNGANNON (AA)	31F/4SE	PIPAWA EXPLORATIONS LTD	NEPHELINE SYENITE	ASSESS	STRIPPING AND BLASTING	1987		DUN026
DUNGANNON (BB)	31F/4SE	PIPAWA EXPLORATION LTD.	NEPHELINE SYENITE	ASSESS	MANUAL WORK	1987		DUN027
DUNGANNON (CC)	31F/4SW	ULRICH KRETSCHMAR	MARBLE BUILDING STONE	ASSESS	GEOLOGY	1987	2.10214	DUN028

TABLE 15.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ELZEVIR (DD)	31C/11SW	JAMES LEON BYER	TALC	ASSESS	GEOLOGY	1985		ELR019
ELZEVIR (EE)	31C/11SW	JAMES LEON BYER	TALC	ASSESS	ASSAYING	1985		ELR020
GRIFFITH (FF)	31F/6	TRISAR RESOURCES LTD	MARBLE	ASSESS	DD5-1132FT	1985		GRH009
GRIMSTHORPE (GG)	31C/13SE	PAUL TULONEN	AU	ASSESS	GEOLOGY	1987		GRE012
HUNGERFORD (HH)	31C/6NE	STEEP ROCK RESOURCES INC.	MICA	ASSESS	DD1-410FT	1986		HUD004
KALADAR (II)	31C/11NE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987	2.10333	KAR039
KALADAR (JJ)	31C/11NE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOLOGY	1987	2.10333	KAR040
KALADAR (KK)	31C/11NE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987	2.10333	KAR041
KALADAR (LL)	31C/11NE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987	2.10333	KAR042
KALADAR (MM)	31C/11NE	HOMESTAKE MINERAL DEVELOPMENT COMPANY	AU	ASSESS	GEOCHEM	1987		KAR043
LAKE (NN)	31C/12NE	A. DAVID HOUSTON	AU	ASSESS	POWER STR	1987		LAE010
LAVANT (OO)	31F/2NE	TODD S.J. SANDERS	CU,AG,PB, HG, BARITE	ASSESS	ASSAYS AND PETROGRAPHY	1987	2.10371	LAT023
LUTTERWORTH (PP)	31D/15SW	NORTHGATE EXPL. LTD.	ZN,PB,AG	ASSESS	GEOCHEM, GEOLOGY	1986	2.9550	LUH008
MADOC (QQ)	31C/12SE	JAMES L BYER	AU	ASSESS	DD1-125FT	1986		MAC078
MADOC (RR)	31C/12SE	JAMES L BYER	AU	ASSESS	DD1-201FT	1986		MAC079
MADOC (SS)	31C/11SW	A DAVID HOUSTON		ASSESS	POWER STR	1986		MAC080
MADOC (TT)	31C/12SE	A DAVID HOUSTON	AU	ASSESS	POWER STR	1986		MAC081
MADOC (UU)	31C/12NE	WILLIAM PURVIS HOUSTON	LIMESTONE BUILDING STONE	ASSESS	DD2-203FT	1987		MAC082
MADOC (VV)	31C/11NW	C ROGER YOUNG	TALC	ASSESS	DD1-273FT	1985		MAC083
MADOC (WW)	31C/12NE	MONO GOLD MINES INC	AU	ASSESS	POWER STR	1987		MAC084
MADOC (XX)	31C/12SE	A DAVID HOUSTON		ASSESS	MANUAL WORK	1987		MAC085
MADOC (YY)	31C/12SE	A. DAVID HOUSTON		ASSESS	POWER STR	1987		MAC086
MADOC (ZZ)	31C/12SE	IKO INDUSTRIES LIMITED	ANDESITE ROOFING GRANULES	NON-ASSESS	OFFICIAL PLAN AMENDMENT APPLICATION	1987		MAC087
MARMORA (aa)	31C/5NE	BELMAR RESOURCES INC.	AU	ASSESS	DD5-995FT	1986		MAA037
MARMORA (bb)	31C/12NE	BOWDIDGE & ASSOCIATE LTD.	AU	ASSESS	EM, GEOLOGY	1987	2.9825	MAA038
MARMORA (cc)	31C/12SE	GARRY W. KELLY	AU	ASSESS	POWER STR	1987		MAA039
MARMORA (dd)	31C/12SW	LACANA	AU	NON-ASSESS	GEOCHEM	1987		MAA040
SHEFFIELD (ee)	31C/11SE	ST. JOE CANADA INC.	CU,PB,ZN	ASSESS	GEOCHEM, EM	1987	2.10009	SHD009
SHEFFIELD (ff)	31C/11NE	ST. JOE CANADA INC.	CU,PB,ZN	ASSESS	GEOCHEM	1985	2.10133	SHD010
TUDOR (gg)	31C/12NE	NATHANEL HELM	AU,FE	ASSESS	ASSAYING	1987		TUR030
TUDOR (hh)	31C/12NE	NATHANEL HELM	AU,FE	ASSESS	POWER STR	1986		TUR031
TUDOR (ii)	31C/12NE	NATHANEL HELM	AU,FE	ASSESS	DRILLING/ BLASTING	1986		TUR032
TUDOR (jj)	31C/12NE	NATHANEL HELM	AU,FE	ASSESS	MANUAL WORK	1987		TUR033

REPORT OF EXPLORATION ACTIVITY 1987
IN
SOUTHEASTERN DISTRICT
ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES

TABLE 15.4

COMPANY	PROPERTY NAME	LOCATION (TOWNSHIP)	COMMODITIES SOUGHT	NOTES
Arbor Resources Inc	Old Diamond Mine, Blakely Mine, Canada Sulphur Ore	Madoc	Gold, silver, copper, zinc	> 9000 ft diamond drilling, and geochemical surveys 1985-86. More work was carried out in 1987.
Arriscraft		Ross Township Area	Marble dimension stone	This company explored for building stone in Renfrew Area.
Barmin		Sheffield	Mica, muscovite flake	Stripping, drill road construction, at least 5 diamond drill holes 1987.
Barmin	Canada Talc Ltd Mine Site	Huntingdon	Talc	Several deep diamond drill holes were drilled in 1987 from surface, to test deep extension of Henderson Orebody.
Belmar Resources Inc	Ackerman Prospect	Marmora	Gold, silver	Diamond drilling 1987.
Black Gregor Explorations Ltd.	Globe Mine	North Elmsley	Graphite	This former 'Globe Mine' was diamond-drilled in 1984. Property has apparently been optioned again, and more work is expected in 1987.
Black Hawk Mining Inc and Cominco	Marmora Wollastonite	Marmora	Wollastonite, calcite	Surface mapping/sampling indicated length 1200m, max width 100m.
Canada Talc Limited		Elzevir	Talc	This deposit was diamond-drilled in 1981. Road built, area cleared, quarry licence acquired.
Canalex Resources Ltd	Stanleyville Deposit	North Burgess	Vermiculite	Large excavation early 1960's, 165000 tons of vermiculite-bearing material was stockpiled. The property was optioned in 1987, and new development will soon begin.
Casino Gold Corporation, Steve Bartlett	Ore Mountain Property	Barrie	Gold, Silver	This gold prospect is being re-examined by means of geology and geophysics
Gateford Resources Inc	Bannockburn Gold	Madoc	Gold	Stripping and diamond drilling in late 1987
Gateford Resources Inc	Cooper Gold	Madoc	Gold	Stripping and diamond drilling in late 1987

TABLE 15.4 Continued

COMPANY	PROPERTY NAME	LOCATION (TOWNSHIP)	COMMODITIES SOUGHT	NOTES
Gateford Resources Inc	Cooper Talc Prospect	Madoc	Talc	7 ddh 1985 by Twin Buttes Exploration Inc. Property recently optioned again.
Guillet, G.R.	Bonter Marble Quarry	Marmora	Calcite, High purity	Geological mapping. This is a past producer of calcite products.
Harwin Exploration and Development Inc	St. Joe	Madoc	Gold, silver	13 claims in 1986, prelim exam & sampling. Geochemistry, geophysics, mapping were planned. Diamond drilling December 1987.
Hill, S.	Boerth Mine	Clarendon	Gold, silver	This high-grade gold prospect is being re-examined by trenching, channelling, geophysics.
Homestake Mineral Development Co		Clarendon	Gold, silver	The company has staked claims on a number of old prospects, and done some 'grass roots' work as well.
Homestake Mineral Development Co	Green Lake Sillimanite	Clarendon	Sillimanite, gold, silver	
I.K.O. Industries Ltd		Madoc	roofing granules ('andesite')	Quarry application under way bulk sample removed 1987. It is planned to begin mining and processing in 1988.
Kretschmar, U., Aur Resources	Tweed Marble Quarry	Hungerford	Marble dimension stone	Test blocks removed from this former producer in 1985. Quarry was again pumped out for testing in 1987.
Lac Minerals Ltd, Gleeson & Rampton		Darling, Lavant	Gold, Silver	In the past few years, geochemistry plus diamond drilling have been carried out. Several new prospects have been found.
Lacana Mining Corporation		Marmora	Gold, silver	This company has optioned properties in the Malone area of Marmora Township.
Lacana Mining Corporation, Roger Young	'Kaladar', 'Omya', 'Koizumi' mica	Kaladar	Mica (muscovite flake)	Diamond drilling 1970's, large bulk sample by Koizumi in 1983. Optioned 1986 by Lacana, 2ddh 1986
Lasir Gold Inc	Cordova Mine	Belmont	Gold, silver	1980-82, heap leaching and small-scale open-air cyanidation of ore tailings. Some gold produced then. The property was optioned in 1987 to a group intersted in developing the on-surface ore and tailings.

TABLE 15.4 Continued

COMPANY	PROPERTY NAME	LOCATION (TOWNSHIP)	COMMODITIES SOUGHT	NOTES
Marathon Minerals Inc		Madoc	Talc	Stripping, sampling, diamond drilling by Derry, Michener, Booth & Whl, 1987
Mono Gold Mines Inc & Micham Exploration Inc	Bannockburn Mine, and new deposit to the northeast	Madoc	Gold, silver	49,000 ft in 153 ddh 1985-87. About 20 acres stripped/washed 1987. Underground development planned for 87-88.
Noranda Inc	Malone Gold Prospect	Marmora	Gold	Trenching, channel sampling 1986. Diamond drilling, more channeling 1987
Novamin Resources, Eldor Resources	Cadieux, Renprior prospects	Admaston	Zinc, lead	Stripping, much diamond drilling over past few years. A decline for underground sampling is planned. This deposit is known as the 'Renprior' and 'Cadieux' properties.
Rebecca Resources Ltd	Timmins Mine	North Burgess	Graphite	This 'Timmins Mine', a former producer is currently under exploration. Recent work on the property includes diamond drilling, sampling/ testing, and geological mapping.
Sands Minerals Corporation	Addington or Golden Fleece Mine	Kaladar	Gold, silver	Diamond drilling planned for 1987. More than 24000 feet diamond drilling carried out by E&B Explorations Inc in 1981-84.
Sands Minerals Corporation	Ore Chimney Mine	Barrie	Gold, silver	Trenching, 4000 feet diamond drilling in 1987
Steep Rock Resources Inc		Hungerford, Kaladar,Darling ...	Mica, talc, calcite...	This company explores every year for industrial minerals in Eastern Ontario. Recent prospects: Elzevir Tp talc, Hungerford & Kaladar Tp mica, various calcite prospects
Steep Rock Resources Inc	Steep Rock Silica Deposit	Bathurst	Silica	diamond drilling about 1982-83. This silica deposit awaits favourable market conditions.
Stewart Lake Resources Inc.	Kirkham, Bawden Graphite Properties	Bedford	Graphite	Kirkham property acquired by option, much other ground staked. The company will complete 30,000 feet diamond drilling , plus stripping in 1987. A bulk sample and mill test are planned.
Stoklosar Marble Quarries Inc		Madoc	Marble chips	This terrazzo chips producer explores for building stone every year.

TABLE 15.4 Continued

COMPANY	PROPERTY NAME	LOCATION (TOWNSHIP)	COMMODITIES SOUGHT	NOTES
Victoria Graphite Inc.		Bastard	Graphite	Several thousand feet of diamond drilling, plus geophysics, were planned for 1987. This is known as the Cornell Property.
Young, C. R.	Belmont Granite	Belmont	Granite dimension stone	Previously drilled. One lift of granite blocks were mined in 1983 by Rock of Ages.

Sands Minerals Corporation have optioned the Ore Chimney Prospect in Barrie Township, and the Addington Mine in Kaladar Township. The company will spend $4 000 000 on these gold properties during the period 1987 to 1991. More than 24 000 feet of diamond drilling were done at the Addington Property from 1981 to 1984, by E B Explorations Incorporated. This Addington Property was estimated to have reserves of about 400 000 tons grading 0.13 ounce gold per ton (Kingston and Papertzian 1982).

MINING ACTIVITY

During 1987, there were 30 industrial minerals mines operating in the Southeastern Resident Geologist's Area. Chromasco Limited continued to produce calcium, magnesium, and strontium metals at Haley Station in Ross Township. There were also about 49 operating limestone aggregate quarries and 209 sand and gravel operations, according to data provided by the Mineral Statistics Section, Ministry of Northern Development and Mines.

Data from the Mineral Statistics Section showed the value of mineral production for the Southeastern Resident Geologist's Area to be $ 279 181 498 in 1985. A more detailed breakdown of mineral production is shown in Table 15.5. Mine and mill locations are shown in Figure 15.2, and mines and mills are listed in Table 15.6.

ONTARIO GEOLOGICAL SURVEY

A number of projects were undertaken in the Resident Geologist's Area by the Ontario Geological Survey during 1987. These projects included mineral deposits studies by G. Di Prisco (Geologist, Precambrian Geology Section, Ontario Geological Survey); J.S. Springer, (Geologist, Northeastern Region, Ontario Ministry of Northern Development and Mines, Sudbury), geological mapping by R.M. Easton (Geologist, Precambrian Geology Section, Ontario Geological Survey); and work on the "Limestone Industries of Ontario" project by M.D. Johnson (Geologist, Engineering and Terrain Geology Section, Ontario Geological Survey). Projects by the Ontario Geological Survey are summarized in Table 15.7 and shown in Figure 15.3.

Publications released in 1987 relating to the Resident Geologist's Area are listed in Table 15.8.

GEOLOGICAL SURVEY OF CANADA (GSC)

Eight GSC projects involved the Southeastern Resident Geologist's Area of the Ministry of Northern Development and Mines in 1987. The projects are listed in Table 15.7.

The Resident Geologist was involved as an advisor in two of these projects which were funded by COMDA. These projects are a) the study of marble-hosted zinc deposits, by A.G. Menard (Geological Consultant, Havelock); and b) the study of sillimanite deposits, by S. Black (Geological Consultant, Sharbot Lake).

MULTIAGENCY GROUP FOR NEOTECTONICS IN EASTERN CANADA (MAGNEC)

This group involves the following co-operating agencies:

1. Geological Survey of Canada, Energy, Mines, and Resources, Canada
2. Ontario Geological Survey, Ministry of Northern Development and Mines
3. Ontario Centre for Remote Sensing, Ministry of Natural Resources
4. Ontario Hydro
5. Atomic Energy Control Board of Canada

This group's work in Eastern Ontario, in 1987, included in-situ stress measurements in boreholes at the Roblindale Limestone Quarry in Camden Township, Lennox and Addington County. The group also studied neotectonic features such as pop-ups, in southern Prince Edward County.

A field trip in the Kingston–Belleville–Prince Edward County area was run by MAGNEC on October 28 and 29, to look at neotectonic features. D.A. Williams of the Resident Geologist's Office guided the field trip on October 28.

TABLE 15.5. MINERAL PRODUCTION DATA 1985, FROM MINERAL STATISTICS SECTION FOR SOUTHEASTERN DISTRICT, ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Commodity	Tonnes	Value ($)
Industrial Minerals and Metals	2,673,095	209,806,160
Limestone Aggregate	16,105,300	47,260,333
Sand and Gravel	9,943,215	22,115,005
Totals	28,721,610	279,181,498

GEOLOGICAL MAPPING FROM THE RESIDENT GEOLOGIST'S OFFICE

FLUORITE, by D.A. Williams

As part of the COMDA-funded unconformity project (a joint project of the Ministry of Northern Development and Mines, Tweed, and the Ontario Geological Survey, Precambrian Geology Section), D.A. Williams and L.G.D. Thompson continued an investigation of the structural setting of the Madoc-area fluorite veins.

Geological field work, in 1987, consisted of examining Paleozoic outcrops and locating Precambrian outcrops, to detect vertical displacement and to determine the location of faults. The known fluorite veins are located next to faults within a southeasterly striking fault zone which is approximately 10 km wide, and extends from Malone, 12 km northwest of Madoc, to Thomasburg, 16 km southeast of Madoc.

In order to define, more accurately, the distribution of the Precambrian-Paleozoic unconformity in Eastern Ontario, the map area was expanded to extend westward to Marmora, northward to Bannockburn, eastward to Tamworth, and southward to Roslin. Drillholes intersecting the unconformity were logged, in co-operation with C.A. Rogers of the Ministry of Transportation, Downsview, as follows: Sparrow Lake (Orillia Township), Longford (Rama Township), Burnt River (Somerville Township), Port Hope (Hope Township), Mathers Corners (Otonabee Township), Allan Mills (Seymour Township), Trenton (Sidney Township), Salmon Point (Athol Township), Blessington (Tyendinaga Township), and Madoc (Madoc Township). The latter drillhole was planned by D.A. Williams and L.G.D. Thompson, and drilled in April 1987, by Sir Sandford Fleming College, Lindsay. The drill crew was supervised by K.R. Fickling. The drillhole successfully intersected the Lee Senior Fluorite Vein, and the drill core is stored at the Tweed Drill Core Library.

Geophysical field work, in 1987, consisted of seismic refraction, magnetic, resistivity, and alpha particle surveys undertaken at O'Hara Mill (Madoc Township), along the Crookston Road (Huntingdon Township), and at Buller and Thomasburg (Hungerford Township).

Both a report on the unconformity project and a page-size map were included in the Summary of Field Work and Other Activities 1987 (Thompson and Williams 1987). At the Ontario Geological Survey's Open House, in December 1987, a display was shown and a paper (Williams 1987) was presented.

INDUSTRIAL MINERALS: TALC

by A. MacKinnon

This project is part of an 18-month, COMDA-funded project which was initiated to evaluate certain industrial minerals occurring in eastern Ontario.

Volcanic-hosted talc bodies are postulated to be altered komatiitic flows or sills (Verschuren 1982; Kretschmar and Kretschmar 1986); a hypothesis also supported by the present field work.

Geological mapping (at 1:10 000 scale) by P.S. LeBaron, during the 1987 field program, was conducted to provide a guide for talc exploration and to map the known talc-bearing zones beyond the boundaries of previous surveys. The study area extends from Highway 7, in Elzevir Township, northward along the western margin of the Elzevir Batholith to the northern end of Lingham Lake in Grimsthorpe Township. Based on whole rock chemical analyses and observed field relations, the mafic metavolcanics were subdivided into tholeiitic basalts, komatiitic basalts, and ultramafic komatiites.

Talcose zones in ultramafic komatiites were found throughout the length of a 400 to 2000 m wide band of basaltic and ultramafic komatiites in Elzevir Township, and, to a lesser extent, in komatiitic flows within an area of tholeiitic basalts in southern Grimsthorpe Township.

Based on outcrop mapping, these talcose zones, with apparent widths of from 5 to 20 m, strike lengths of over 300 m, and grading 20 to 80 percent talc, appear to have economic potential. However, due to poor exposure, the overall composition of these talc bodies is largely unknown . The talc bodies generally follow zones of low topographical relief, disappearing into low, overburden-covered areas or swamps.

The grade and size of komatiite-hosted talc occurrences in the Tudor Formation compares favorably with those of currently producing Ontario talc mines. Studies indicate that a talc product of moderate to high purity could be produced by floatation for use as a filler in paper, paint, plastics, and ceramics industries (Dillon and Barron 1985).

Work on komatiite-hosted talc was described in the Summary of Field Work and Other Activities 1987 (LeBaron *et al.* 1987). A map (at 1:50 000 scale) and samples were shown at the Ontario Geological Survey's Open House in December 1987.

REFRACTORY MINERALS: WOLLASTONITE

by A. MacKinnon

This project is in the second year of an 18-month, COMDA-funded program to evaluate the quality and quantity of various refractory and industrial minerals available in eastern Ontario.

Emphasis for the 1987 field season was on identifying and evaluating wollastonite occurrences associated with the Deloro Pluton.

REPORT OF MINING ACTIVITY 1987
IN
SOUTHEASTERN DISTRICT
ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES

TABLE 15.6

MAP NO	COMPANY	MINE	LOCATION (TOWNSHIP)	COMMODITIES	NOTES
** COMMODITY TYPE: Building Stone					
10	3 M Canada Inc.		Belmont	Traprock	Roofing granules are produced from traprock at this mine.
23	Arriscraft		Bastard	Sandstone	Sandstone for manufacture of reconstituted sandstone. Raw material is shipped to Cambridge for processing.
11	Canada Talc Industries Ltd.	Henderson & Conley Mines	Huntingdon	Marble	Dolomitic marble terrazzo chips are produced from this talc mine
3	Central Ontario Natural Stone		Somerville	Stone	Flagstone
30	Cornwall Sand and Gravel		Cornwall	Limestone	Limestone blocks for dimension stone are produced from thick upper beds of this crushed stone quarry
20	Fairmont Granite Ltd. and Granicor	Battersea Granite Quarry	Storrington	Granite	Granite blocks for dimension stone. Blocks are processed at Beebe, Quebec.
21	Granimar Resources	Straw Hill Quarries	Rear of Leeds and Lansdowne	Granite	Granite Waste from former dimension stone producer is used to produce decorative aggregate.
31	Karnuk Marble Quarries Ltd		Cornwall	Dimension Stone	This high technology dimension stone finishing plant produces tiles and panels of marble and granite purchased off site
4	MacDonald		Lutterworth	Stone	Flagstone
7	Ormell Sand and Gravel		Harvey	Limestone	Flagstone is produced from this limestone aggregate quarry
19	Sloan, N.	Sloan Quarry	Storrington	Sandstone	Sandstone building blocks (ashlar)
12	Stoklosar Marble Quarries Ltd		Madoc	Marble	Marble chips (terrazzo)
22	W.R. Barnes Company Limited		Rear of Leeds and Lansdowne	Granite	Decorative aggregate is produced from this quarry.
6	Windover, N.		Harvey	Limestone	Flagstone

TABLE 15.6 Continued

MAP NO	COMPANY	MINE	LOCATION (TOWNSHIP)	COMMODITIES	NOTES
8	Windover, N.		Harvey	Limestone	Flagstone
** COMMODITY TYPE: Building Stone, Gemstones					
14	Wal-Gem Lapidary	Wal-Gem West Quarry	Lyndoch	Stone, Gemstones	Mineral specimens, mineral chips for construction: rose quartz, granite, feldspar, white quartz
** COMMODITY TYPE: Cement					
18	Can. Cement LaFarge Ltd. (Bath)		Ernestown	Cement	Cement is produced on site
17	Lake Ontario Cement Ltd.		Sophiasburg	Cement	Cement is produced on site
2	Saint Lawrence Cement Co Ltd		Cramahe	Cement	Mine only. Rock is barged to Clarkson plant near Oakville for processing
1	St. Mary's Cement Ltd (Bowmanville)		Darlington	Cement	Cement is produced on site
** COMMODITY TYPE: Clay Products					
28	Canada Brick Division, Jannock Ltd		Russell, Gloucester	Clay Products	Brick, from red shale. Quarry in Russell Tp, Plant in Gloucester Tp
27	The Bestiary		Montague	Clay Products	
** COMMODITY TYPE: Gemstones					
13	Princess Sodalite Mine	Princess Sodalite Mine	Dungannon	Gemstones	Sodalite is mined, the mine is also open to mineral collectors
15	Wal-Gem Lapidary	Wal-Gem East Quarry	Lyndoch	Gemstones	Mineral specimens, especially rose quartz
** COMMODITY TYPE: Industrial Minerals					
29	A.L. Blair Construction Ltd.		Finch	Lime	Agricultural Lime is produced from this crushed aggregate quarry

TABLE 15.6 Continued

MAP NO	COMPANY	MINE	LOCATION (TOWNSHIP)	COMMODITIES	NOTES
16	Barmin Inc	Northbrook Mill	Kaladar	Ind. Minerals	This mill (no mine) processes talc from Madoc, plus alumina, silica products, and other materials.
5	Bolenders Ltd.		Guilford	Stone	Dolomite (marble): poultry grit, golf sand, decorative aggregate, white powder sold for use in bricks and mortar
11	Canada Talc Industries Ltd.	Henderson, Conley Mines	Huntingdon	Talc	Mills are at Madoc and Marmora
9	Indusmin Division of Falconbridge	Blue Mtn, Nephton, Cabin Ridge q	Methuen	Nepheline Syenite	Nepheline syenite is produced form two mines in this township. Magnetite is also produced.
24	Ram Petroleums (Golden Shield Res)		Palmerston	Tremolite	Tremolite rock containing some talc is mined on an intermittent basis.
25	Steep Rock Resources Inc	Tatlock Quarry	Darling	Calcite	High-purity, fine-grind calcite for fillers, plus other grades of calcite, and marble chips. Mill is west of Perth.
** COMMODITY TYPE: Metals					
26	Chromasco Ltd.(Div. of Timminco)		Ross	Magnesium	Magnesium is produced from dolomite mined at this location. Strontium, Calcium from purchased material.

Reconnaissance mapping (at 1:10 000 scale) of an arcuate zone 1.0 to 1.5 km wide extending approximately 10 km along the western margin of the Deloro Pluton, in Marmora and Madoc Townships, identified several previously undocumented occurrences of wollastonite. The host rocks for wollastonite mineralization are white- to green-coloured, fine- to medium-grained, calcitic marbles, and skarn zones, adjacent to the Deloro Pluton and its satellite plutons. Detailed mapping was carried out on three occurrences identified by last year's work (MacKinnon, Kingston, and Caley 1987). Several exploration targets grading 20 to 50 percent wollastonite were located during the field investigation. Because of poor outcrop exposure, stripping and detailed mapping are required to accurately evaluate these areas.

This year's work was described in the Summary of Field Work and Other Activities 1987 (MacKinnon and Kingston, 1987). A display of the geological mapping, and cut and polished samples of typical wollastonite mineralization was shown at the Ontario Geological Survey's Open House in December 1987.

GEOPHYSICS

by L.G.D. Thompson

The Office of the Geophysicist conducts the following functions:

1. performance of geophysical surveys in support of the geology projects conducted under the Resident Geologist, Ministry of Northern Development and Mines, Tweed, and also for other Regions, Districts, and agencies on request
2. development of new or improved instrumentation and survey methods to meet special survey requirements
3. provision of consultative service to individuals and mineral exploration companies

SEISMIC REFLECTION DATA PROCESSING

To enhance the utility of a Computer Aided Portable Seismograph (CAPS) system developed previously, (L.G.D. Thompson *in* Kingston and van Haaften 1987) a computer program called ProSeis has been devel-

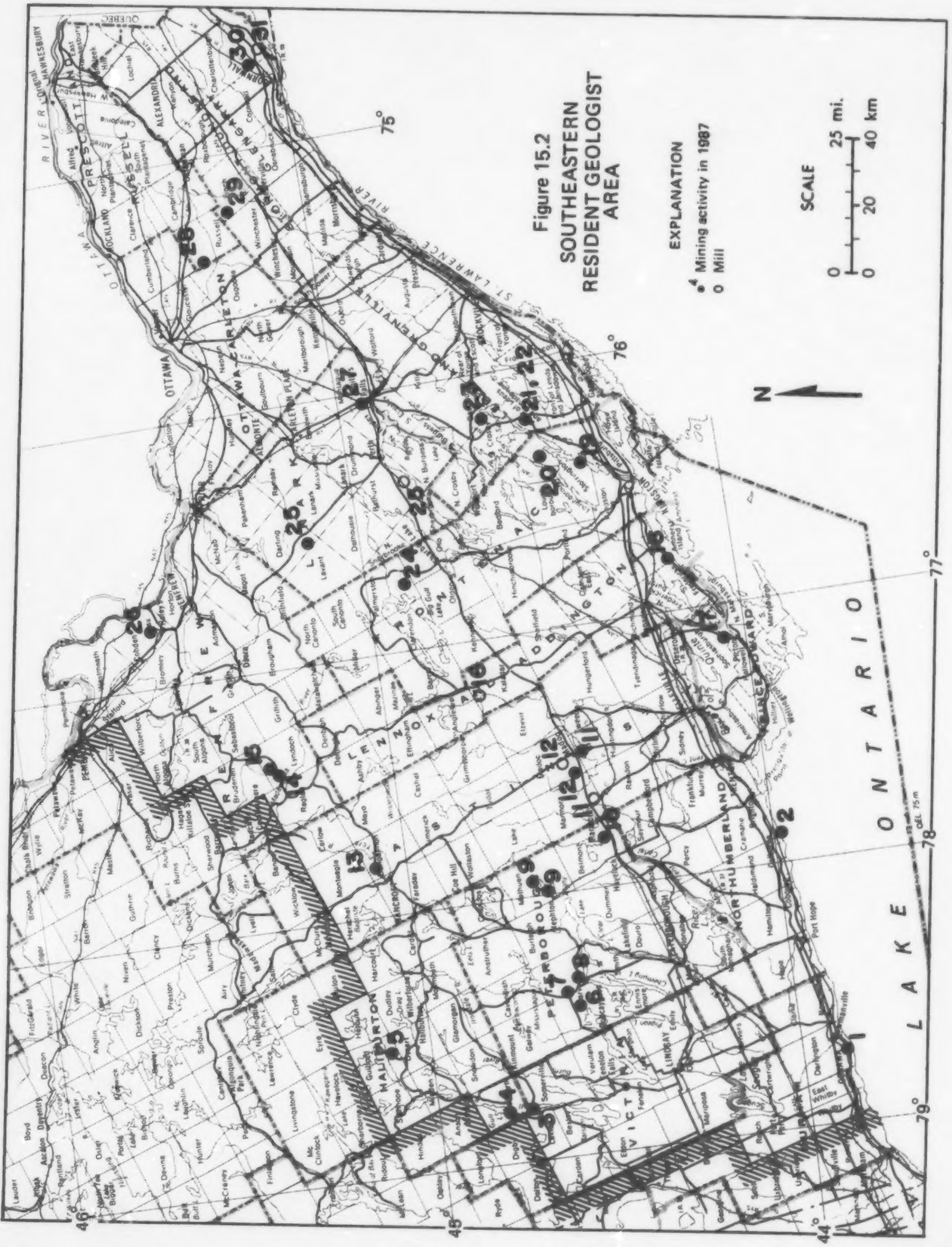
EXPLANATION
Mining activity in 1987
Mill
SCALE
0 20 25 mi.
0 20 40 km
N
LAKE ONTARIO
ST. LAWRENCE RIVER
OTTAWA RIVER
QUEBEC
OTTAWA
KINGSTON
BROCKVILLE
CORNWALL
HAWKESBURY
PEMBROKE
RENFREW
LINDSAY
PRESCOTT
RUSSELL
CARLETON
GRENVILLE
LANARK
FRONTENAC
LENNOX
ADDINGTON
HASTINGS
PETERBOROUGH
NORTHUMBERLAND
PRINCE EDWARD
HALIBURTON
VICTORIA
75°
76°
77°
78°
79°
44°
45°
46°

Figure 15.2 SOUTHEASTERN RESIDENT GEOLOGIST AREA

GOVERNMENT GEOLOGY PROJECTS 1987
IN
SOUTHEASTERN DISTRICT

TABLE 15.7 ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES

MAP NO	PROJECT LEADER	PROJECT	AREA OF WORK	TYPE OF WORK
** ORGANIZATION: Ministry of Northern Development and Mines, Southern Ontario Region				
* DIVISION: Southeastern District, Tweed				
4	LeBaron, P.	Industrial Minerals - Talc. Funded by COMDA.	Elzevir, Grimsthorpe, Madoc Townships	Bedrock mapping to identify talc- bearing zones and areas with potential for talc mineralization
6	LeBaron, P.	Ore Chimney Prospect. Funded by COMDA.	Barrie Township	Geological mapping and diamond drill core logging
8	MacKinnon, A.	Refractory Minerals - Graphite in the Desert Lake Area. Funded by COMDA.	Bedford Township	Geological reconnaissance of this graphite- bearing area to prepare for detailed work planned for 1988.
2	MacKinnon, A.	Refractory Minerals - Wollastonite in the Marmora area. Funded by COMDA.	Marmora, Madoc, Rawdon Townships	Geological mapping, sampling to identify wollastonite deposits.
3	Williams, D. and Thompson, L.	Structural Setting of the Madoc- Area Fluorite Veins. Part of the COMDA- funded unconformity project	Madoc Area, Hastings County	Bedrock geology mapping and geophysics.
** ORGANIZATION: Ministry of Natural Resources Eastern Region				
* DIVISION: Kemptville Office				
10	Gorrell, G.A.	Blending Sand. Funded by COMDA.	Southeast of Ottawa	Surficial geology mapping, sampling to locate deposits of blending sand, a high- value aggregate which is scarce near Ottawa
10	Gorrell, G.A.	Buried Aggregate. Funded by COMDA.	Southeast of Ottawa	Surficial geology mapping, stratigraphic studies to locate buried aggregate deposits and aquifers.
** ORGANIZATION: Ontario Geological Survey				
* DIVISION: Engineering & Terrain Geology				
	Johnson, M.D.	Limestone Industries Study	All of Ontario	Geological input completed to this study of limestone resources, carried out with Ministry of Natural Resources

TABLE 15.7 Continued

MAP NO	PROJECT LEADER	PROJECT	AREA OF WORK	TYPE OF WORK
* DIVISION: Precambrian Geology				
1	DiPrisco, G.	Unconformity Study. Funded by COMDA.	Stony Lake area of Eastern Ontario	Investigation of metallogenic factors related to the Grenville/Paleozoic unconformity in the Stoney Lake area.
9	Easton, R.M.	Geological mapping in the Darling area, scale 1:15,840	Frontenac, Lanark and Renfrew Counties	Geological mapping
	Springer, J.S.	Investigation of mineralization in the Grenville Province of Eastern Ontario	Eastern Ontario	Metallogenic Studies
** ORGANIZATION: Geological Survey of Canada				
* DIVISION: Mineral Resources				
5	Black, S.	Sillimanite Project. Funded by COMDA.	Frontenac, Hastings, Leeds & Grenville, Lennox & Addington Counties	Mapping and sampling of sillimanite/ muscovite deposits.
	Holman, P.B.	Airborne Gamma Ray Spectrometry	Bancroft	Extend survey area with 1 km line spacing
	Larose, J.M.	Rock and Mineral Sets Preparation	Many areas in Ontario including Ottawa, Madoc, Perth, Kingston areas	Mineral Collecting
	Menard, A.	Marble- Hosted Zinc Deposits. Funded by COMDA.	Lennox & Addington, Frontenac, Renfrew Counties	Mapping, sampling of zinc deposits
* DIVISION: Terrain Sciences				
	Anderson, T.W.	Quaternary paleoecology, Great Lakes	Lake Erie, Eastern Ontario and Southern Quebec	Lake and bog bottom sampling for palynological investigations
	Kaszycki, C.A.	Glacial erosion of the Canadian Shield	Haliburton region	Surficial geology mapping, drift dispersion sampling.

TABLE 15.7 Continued

MAP NO	PROJECT LEADER	PROJECT	AREA OF WORK	TYPE OF WORK
	Pullan, S.E.	High resolution seismic equipment development	Ottawa area, Timmins area, Vancouver area	Seismic surveys
	Richard, S.H.	Surficial geology, Ottawa Valley Lowland	Cornwall, Quyon	Stratigraphic mapping, sample collecting
	Shilts, W.W.	Properties and provenance of glacial sediments	Eastern Ontario	Mapping and sonar surveys
** ORGANIZATION: Multi-Agency Group for Neotectonics in Eastern Canada (MAGNEC)				
* DIVISION:				
7	Mc Fall, G. and Gorrell, G.A.	Neotectonic Features in Prince Edward County	Southern Prince Edward County	Surficial geology mapping to locate pop- ups and other neotectonic features. Work funded by OGS and AECB

oped for processing and plotting 12-channel seismic reflection records using IBM PC© computers and compatibles. ProSeis was designed for the seismic reflection survey procedures used by the Office of the Geophysicist, Ministry of Northern Development and Mines, Tweed. ProSeis was written in Turbo Pascal© by Stephen Balch (Research Geophysicist, Morris Magnetics, Lucan, Ontario).

ProSeis supplements SeisView*, the seismic refraction data processing computer program provided by EG Geometrics for use with their portable seismographs. ProSeis uses directly the data files stored on floppy disks by SeisView. ProSeis provides for static corrections, trace filtering, reflection arrival-time picking, time-velocity analysis, automatic or individual trace gain adjustment, Normal Move-Out corrections, and other features. ProSeis plots both forward and reverse, fully corrected traces on a dot matrix printer. The traces are plotted at the actual bedrock reflection points in a conventional profile format with the X-axis (distance) to the right.

The following lists the significant advantages of the reflection method using the ProSeis data processing and display technique.

1. A plot of the corrected traces gives a continuous visual picture of the variation in the bedrock depth instead of just a series of individual depth points.
2. Strong reflections within the overburden indicate sand, gravel, or till layers overlying the bedrock, which can be identified by more detailed analysis and interpretation of the records.
3. Sand, gravel, or till layers can be detected under a thick (more than 20 m) surface layer of clay, which is not usually possible with the refraction method.
4. Bedrock depths of 30 m and greater can be measured, whereas the refraction method can generally measure only depths less than 20 m.

GEOPHYSICAL STUDY OF FLUORITE DEPOSITS

The geophysical study of the fault system associated with the fluorite deposits in the Madoc area that was started in 1985 (L.G.D. Thompson *in* Kingston and Papertzian 1986) was continued in 1987. This work was done in conjunction with a study of the structural setting of fluorite deposits being conducted by D.A. Williams under the COMDA-funded Unconformity Study project. The results of these geophysical surveys are fully reported in a published paper (Thompson and Williams 1987).

Seismic refraction surveys, consisting of forward and reverse spreads 52 m in length, with geophones at 4 m intervals, were done at O'Hara Mill, along the Crookston Road, at Thomasburg, and at seven test sites. In all, 33 forward and reverse spreads were done, which are equivalent to 66 single-line depth measurements. At O'Hara Mill, the seismic results indicated a fault just west of the Concession 4 road, between Precambrian mafic metavolcanics on the west and Paleozoic Shadow Lake Formation sediments on the east. Along the Crookston Road, the seismic results indicated a faulted narrow band of Precambrian rock situated within the Paleozoic Bobcaygeon Formation. This information aided in the mapping of the faults in the study area (Thompson and Williams 1987).

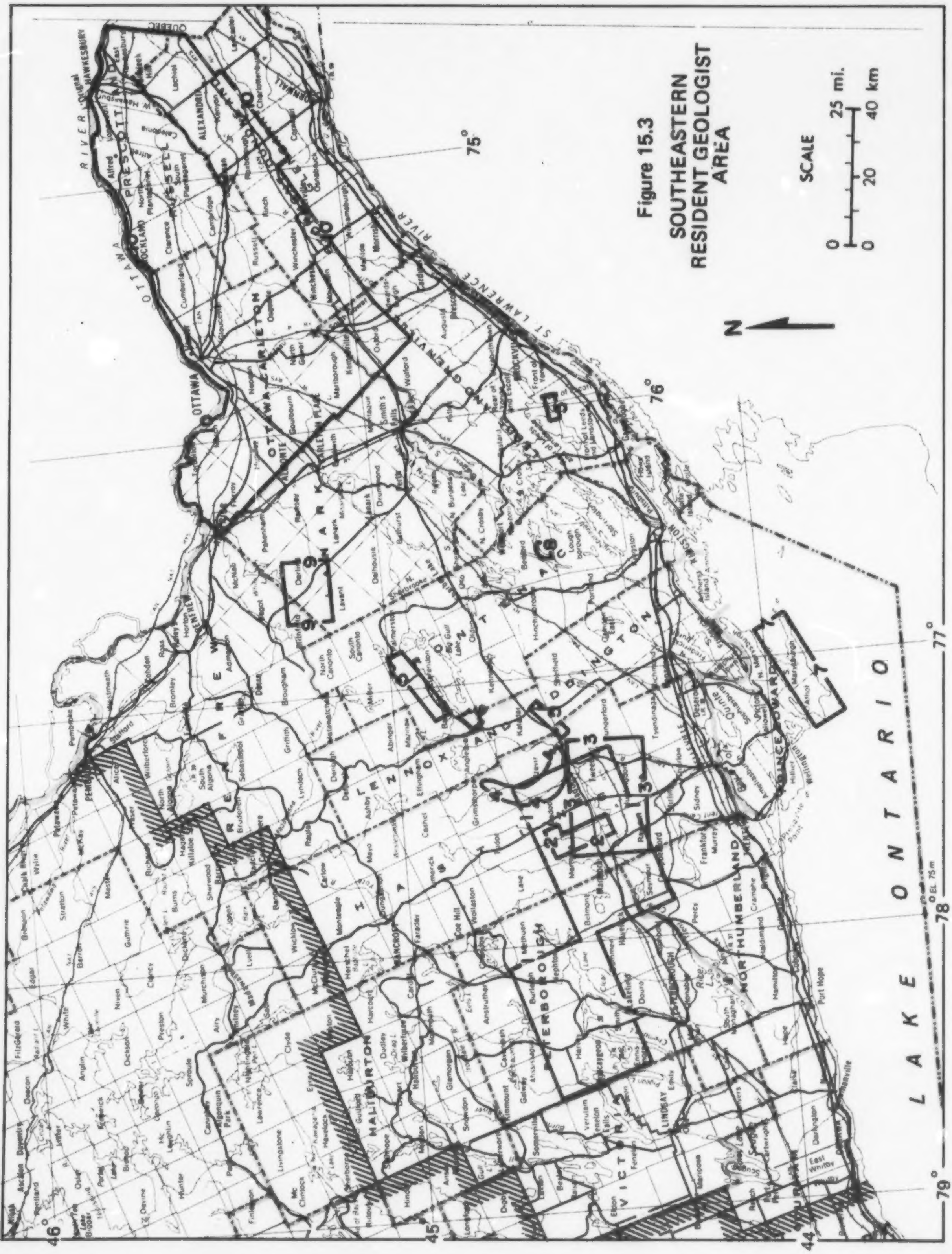
OTTAWA
OTTAWA RIVER
ST LAWRENCE RIVER
LAKE ONTARIO
PRESCOTT
RUSSELL
ALEXANDRIA
CARLETON
LANARK
RENFREW
FRONTENAC
LENNOX AND ADDINGTON
HASTINGS
PETERBOROUGH
NORTHUMBERLAND
HALIBURTON
VICTORIA
LINDSAY
PRINCE EDWARD
KINGSTON
BROCKVILLE
PEMBROKE
HAWKESBURY
CORNWALL
QUEBEC
N
SCALE
0 20 25 mi.
0 40 km
75°
76°
77°
78°
79°
44
45
46

Figure 15.3
SOUTHEASTERN
RESIDENT GEOLOGIST
AREA

TABLE 15.8

ONTARIO GEOLOGICAL SURVEY PUBLICATIONS RELEASED IN 1987 RELATING TO SOUTHEASTERN DISTRICT ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES

** PUBLICATION TYPE: MAP

PUBL	NUMBER	CITATION
Map	2505	Mines and Minerals Division Administrative Areas and Offices, compiled by staff of the Mines and Minerals Division, Ministry of Northern Development and Mines. Scale 1:1,584,000 or 1 inch to 25 miles.
OFM	70	Aggregate Assessment in Haliburton County, Southern Ontario (1 map), by G.R. Jones, M.E. Gauvreau, and S. Szoke, scale 1:100,000. Available for viewing at MNDM offices in Bancroft and Dorset.
OFM	94	Geology of the Darling Area, Lanark and Renfrew Counties, by R.M. Easton, 3 maps (1 at 1:15,840, 2 at 1:50,000 scales). Available for viewing at the Resident Geologist's Office in Tweed.
OFM	95	1:50,000 Geological Compilation of the Minden Area (NTS 31D/15), by R.M. Easton, 1 map, scale 1:50,000. Available for viewing at the Resident Geologists' Offices in Dorset and Tweed.
OFM	96	1:50,000 Geological Compilation of the Clyde Forks Area (NTS 31F/2), by R.M. Easton, 1 map, scale 1:50,000. Available for viewing at the Resident Geologist's Office in Tweed.
OFM	97	1:50,000 Geological Compilation of the Sharbot Lake Area (NTS 31C/15), by R.M. Easton, 1 map, scale 1:50,000. Available for viewing at the Resident Geologist's Office in Tweed.
OFM	105	Geological and Geophysical Studies of the Madoc Fluorite Area, by D.A. Williams and L.G.D. Thompson, 1 map, scale 1:50,000, and figures. Available for viewing at the Resident Geologist's Office in Tweed.
OFM	106	Wollastonite Occurrences Associated with the Deloro Pluton, by A. MacKinnon and P.W. Kingston, 1 map, scale 1:10,000, photos, and notes. Available for viewing at the Resident Geologist's Office in Tweed.
OFM	107	Komatiite- Hosted Talc in the Tudor Formation, Elzevir, Madoc and Grimsthorpe Townships, by P.W. Kingston, A. MacKinnon, and P.S. LeBaron, 1 map, scale 1:50,000, photos, and notes. Available for viewing at the Resident Geologist's Office in Tweed.
P	2205	Precambrian Geology of the Eels Lake Area, Haliburton and Peterborough Counties (NTS 31 D/16). Geology by E.G. Bright and assistants, 1975, 1976 with supplemental mapping in 1977. Compilation by E.G. Bright, 1978, 1985. Scale 1:50,000

TABLE 15.8 Continued

PUBL	NUMBER	CITATION
P	2691	Sand and Gravel Assessment of Frontenac County, South Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2692	Sand and Gravel Assessment of Frontenac County, Central Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2693	Sand and Gravel Assessment of Frontenac County, North Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2694	Bedrock Aggregate assessment of Frontenac County, South Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2973	Sand and Gravel assessment of Lennox and Addington County, South Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2974	Sand and Gravel assessment of Lennox and Addington County, Central Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2975	Sand and Gravel assessment of Lennox and Addington County, North Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2976	Bedrock Aggregate assessment of Lennox and Addington County, South Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2977	Sand and Gravel assessment of Lennox and Addington County, South Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2978	Sand and Gravel assessment of Lennox and Addington County, South-Central Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2979	Sand and Gravel assessment of Lennox and Addington County, North-Central Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2980	Sand and Gravel assessment of Hastings County, North Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000

TABLE 15.8 Continued

PUBL	NUMBER	CITATION
P	2981	Bedrock Aggregate assessment of Hastings County, South Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	2982	Bedrock Aggregate assessment of Hastings County, South-Central Sheet, Southern Ontario, by Staff of the Ministry of Natural Resources, Eastern Region (coloured). Scale 1:50,000
P	3071	Precambrian Geology of the Lochlin Area, Haliburton County (31 D/15). Geology by R.M. Easton, M. van Kranendonk, and assistants, 1985. Scale 1:15,840 or 1 inch to 1/4 mile.
P	3079	Lithofacies, Stromatolite Localities, Metallic Mineral Occurrences, and Geochemical Anomalies Associated with Carbonate Mteasediments, Burleigh Falls-Bancroft-Madoc Area, S. Ontario (31C,D,E,F). J.R. Bartlett, M.S. Bourque, R.M. Easton, sc 1:126,720
** PUBLICATION TYPE: PAMPHLET		
		Canada-Ontario Mineral Development Agreement Annual Report 1985-1986, Booklet is in English and French, 10p.
** PUBLICATION TYPE: REPORT		
		The Clay and Shale Industries of Ontario, by G.R. Guillet and I.H. Joyce, by the Ontario Ministry of Natural Resources, 157p.
MP	77	Index to Published Reports and Maps, 1978-1986 Supplement, prepared by the Geoscience Data Centre, Ontario Geological Survey, 434 p.
MP	134	Report of Activities, 1986, Regional and Resident Geologists, edited by C.R. Kustra, 322 p.
OFR	5580	Aggregate Resources Inventory of the County of Lennox and Addington, Southern Ontario, by Staff of the Eastern Region, Ontario Ministry of Natural Resources, 72p., 2 figures, 19 tables, 4 appendices, and Maps P.2973 to P.2976 (coloured).
OFR	5581	Aggregate Resources Inventory of the County of Frontenac, Southern Ontario, by Staff of the Eastern Region, Ontario Ministry of Natural Resources, 78p., 2 figures, 23 tables, 4 appendices, and Maps P.2691 to P.2694 (coloured) in back pocket.

TABLE 15.8 Continued

PUBL	NUMBER	CITATION
OFR	5582	Aggregate Resources Inventory of the County of Hastings, Southern Ontario, by Staff of the Eastern Region, Ontario Ministry of Natural Resources, 120p., 2 figures, 31 tables, 4 appendices, and Maps P.2977 to P.2982 (coloured) in back pocket.
OFR	5604	Geology of the Eels Lake Area, County of Peterborough, by E.G. Bright, 190p., 8 figures, 20 tables, 12 photos, and Map P.2205 (Revised) in back pocket.
OFR	5635	An Inventory of the Mineral Resources in Peterborough County, by A.G. Menard, 335p., 1 table, and 1 map in back pocket.
OFR	5639	Geology of the Howland Area, Haliburton, Peterborough, and Victoria Counties, by R.M. Easton, 188p., 19 figures, 13 tables, 15 photos, and Map P.2699 in back pocket.
OFR	5658	Precambrian Geology of the Centre Lake Area, Haliburton and Hastings Counties, by E.G. Bright, 186p., 2 figures, 2 tables, and Maps P.2797 and 2798 in back pocket.
OFR	5678	Geology of the Lochlin Area, County of Haliburton, by R.M. Easton, 251 p., 27 figures, 15 tables, 14 photos, 5 appendices, and Map P.3071 in back pocket

Total field magnetic surveys with measurements every 4 m were done along the seismic survey lines at O'Hara Mill, along the Crookston Road, and at Buller (Concession 9).

Scintillometer examinations were made at the sites of the McIlroy, Noyes, and Rogers fluorite Mines. An additional alpha meter survey was done along the railroad at the Buller Siding site. Alpha meter tests were also done at the McIlroy and Noyes fluorite Mines. An extensive test of the alpha meters was done at the Ministry of Northern Development and Mines Drill Core Library site near Tweed to assess the uncertainty in a single 24-hour reading for any one alpha meter randomly selected and placed.

BURIED AGGREGATES PROJECT (COMDA)

A major portion of the summer seismic field survey program (two months) was in support of the COMDA-funded Buried Aggregates Project conducted by the Mines Section, Eastern Region, Ministry of Natural Resources, Kemptville, Ontario. The purpose of the seismic survey work was to locate gravel-filled erosion channels in the Paleozoic bedrock under a thick surface layer of clay.

Thirteen seismic-profile lines, totalling about 13.5 km, were completed. Nine profile lines were completed, from the area east of Winchester northward through the Vars area to the Navan area. Four profile lines were done, from the area east of Crysler northwards through the Casselman area to the Lemieux area. Seven of these lines, requiring 73 forward and reverse spreads 52 m in length, were done primarily by the refraction method because bedrock depths were shallow. Six lines, where bedrock was deeper, were done primarily by the reflection method, and required 60 forward and reverse reflection spreads, 100 m in length. A total of 133 forward and reverse spreads were, therefore, completed which are equivalent to 266 single-line depth measurements. For the reflection lines, the ProSeis plotting of the corrected seismic reflection data gave semicontinuous profiles showing the variation in depth of the Paleozoic bedrock. In addition, the profiles showed all layers of gravel or till overlying the bedrock or filling erosion channels in the bedrock.

CONSULTATION SERVICES

Geophysical consultation was provided on more than ten occasions to mineral exploration companies and individuals.

In December 1987, at the Ontario Geological Survey Geoscience Research Seminar and Open House, the Tweed Resident Geophysicist presented a demonstration of the ProSeis computer program for processing seismic reflection data. The Tweed Resident Geophysicist also shared with D.A. Williams a poster display illustrating the published paper on Geological and Geophysical Studies of the Madoc Fluorite Area, Southern Ontario.

TEXT NOTES

[a] dBase III PLUS is a trademark of Ashton-Tate.

[b] Inmagic is a trademark of Inmagic Incorporated.

[c] IBM and PC are trademarks of International Business Machines Corporation.

[d] Turbo Pascal is a trademark of Borland International, Incorporated.

[e] SeisView is a trademark of EG Geometrics, Incorporated.

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16. Southwestern Resident Geologist's Area—1987

B.H. Feenstra

Resident Geologist, Ministry of Northern Development and Mines, London

INTRODUCTION

In 1987, the Southern Ontario Region of the Mines and Minerals Division opened a new office in London, serving the southwestern part of the province. The office is located at 659 Exeter Road, in the main provincial government building adjacent to the drill core and cuttings storage facility at the Petroleum Resources Laboratory of the Ministry of Natural Resources, and the Soils and Aggregates Testing Laboratory of the Ministry of Transportation. Staff include Bern Feenstra as Resident Geologist, and Susan Brown as secretary.

The Southwestern district encompasses all of the Lower Great Lakes peninsular area south and west of Highway 12, which roughly follows the eastern boundary from Ajax and Whitby to Midland (*see* Figure 16.1). Although the area covers less than six percent of the province, it contains more than 80 percent of Ontario's population.

The geology of the area is characterized by Quaternary glacial deposits (till, sand, gravel, clay) and underlying Paleozoic bedrock carbonates and shales, associated beds of salt and gypsum, and minor sandstones. Surficial geology map coverage of the area is nearly complete and predominantly at a scale of 1:50 000. Paleozoic bedrock geology map coverage is also complete; however, coverage in some parts of the area is at a scale of 1:50 000 or 1:63 360, and in other parts at a scale of 1:250 000 or 1:253 440.

The mineral resources of the Southwestern District provide the bulk (65 percent) of Ontario's structural material and nonmetallic mineral wealth (Gartley 1987); i.e., all of the province's salt and gypsum production, nearly all of the clay and shale production, and most of the crushed stone, sand and gravel, calcined lime, and cement production. Building stone production accounts for approximately 28 percent of the total.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist provided industry, individuals, and government agencies with advisory services, and geoscience and industrial mineral resource information in support of exploration, development and production, and land use planning.

A publicly accessible geoscience and mineral resource information reference library for Southwestern Ontario is maintained at the Resident's Office. A computerized database inventory of industrial rocks and minerals and related mining activity in the district is currently being compiled by Susan Brown.

The responsibility of selling prospector's licences, licence renewals, and claim tags was transferred to the Resident Geologist from the Southwestern Region of the Ministry of Natural Resources on October 1, 1987. Copies of the Mining Act as well as staking and working claim forms may also be obtained at the Resident's Office. In addition, the office plans to start selling reports and maps published by the Mines and Minerals Division early in 1988.

The Resident Geologist carried out a program of drilling and sampling Quaternary glacial sediments and the underlying Paleozoic Bedford Formation shale in the Sarnia-Windsor area in March and April, 1987. This project was completed in support of studies on the origin and distribution of kaolinite in the glacial sediments and Bedford shale, on the origin and provenance of the glacial sediments, and the glacial history of the area. The project was funded by the Southwestern Region of the Ministry of Natural Resources.

At the annual meeting of the Canadian Ceramic Society in Montreal, in February 1987, Bern Feenstra presented a paper on Ontario's raw materials for heavy clay products, ceramic tile and sanitaryware, electrical porcelain, refractory products, and artware. The paper was coauthored by Geoff Minnes (Policy Analyst, Industrial Minerals Section, Mines and Minerals Division, Toronto).

Bern Feenstra led part of the International Union For Quaternary Research (INQUA) field excursion A-11 in the Quaternary geology of Southern Ontario, July 21 to 30, 1987. The Resident Geologist also organized a field trip to a marble finishing plant and gypsum mine in the Cambridge-Hagersville area, for the Southern Ontario Group, Mines and Minerals Division, September 17 to 18, 1987.

KAOLINITIC BEDFORD SHALE AND GLACIAL GEOLOGY, SARNIA—WINDSOR AREA

The occurrence of moderate amounts of kaolinite clay mineral in Upper Devonian-Lower Mississippian Bedford Formation clay shale bedrock, buried below thick Quaternary glacial drift south of Sarnia, was reported by Greg Brown (Department of Geology, University of Western Ontario) and the Resident Geologist at the 1986 Geoscience Research Seminar of the Ontario Geological Survey, December 3 and 4, 1986, in Toronto. The results were based on X-ray diffraction (XRD), X-ray fluorescence (XRF), and reflectance spectrometer analyses of core samples of the Bedford shale from the following drillholes (*see* Figure 16.2 for location): ARGOR 65-1 (Petroleum Resources Laboratory, London), O.G.S. KP-24 (Johnson 1985), and O.G.S. 82-1 (Johnson *et al.* 1985). The analyses were carried out by the Geoscience Laboratories, (XRD, XRF)(Ray Laakso, Supervisor, Mineral Sciences, Geoscience Laboratories, Ontario Geological Survey, Toronto, personal communication, 1985, 1986), at the University of Guelph (XRD)(P. Churcher, Graduate Student, Department of Earth Sciences, University of Waterloo, personal communication, 1985; M. Dussault, Professor, Department of Earth Sciences, University of Waterloo, personal communication, 1986), and at the University of Western Ontario (XRD, XRF)(Greg Brown, Graduate Student, Department of Geology, University of Western Ontario, London, personal communication, 1986). Reflectance spectrometry was carried out by Barringer Research Limited (Paul Law-

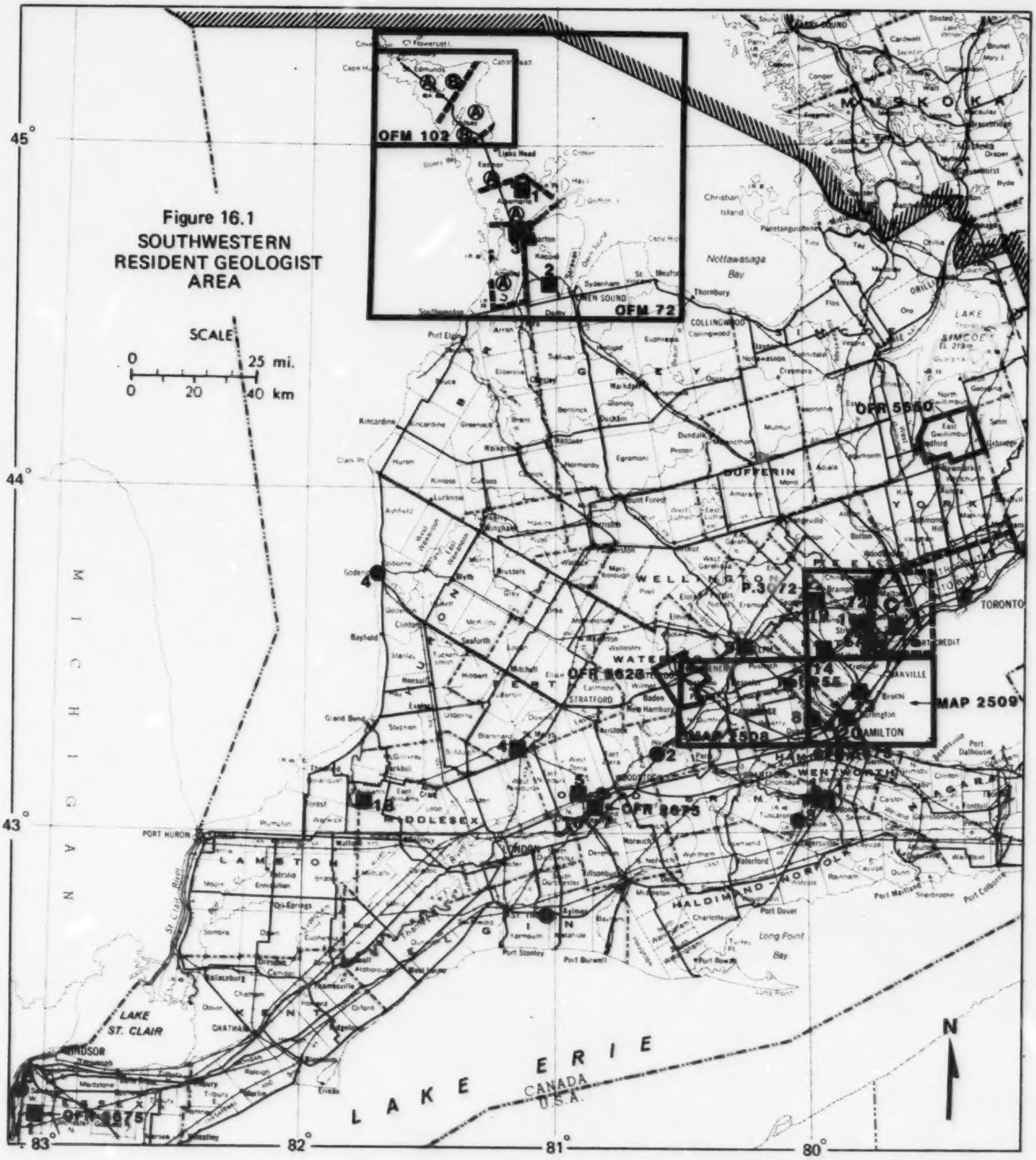

OFM 102
OFM 72
OFR 5650
P.3072
OFR 5628
MAP 2508
MAP 2509
OFR 5675
SCALE
0
25 mi.
0
20
40 km
45°
44°
43°
83°
82°
81°
80°
M I C H I G A N
LAKE ST. CLAIR
L A K E   E R I E
CANADA
U.S.A.
N
Nottawasaga Bay
LAKE SIMCOE
Long Point Bay
TORONTO
HAMILTON
STRATFORD
PORT HURON
OWEN SOUND
COLLINGWOOD
WINDSOR
CHATHAM
WELLINGTON
DUFFERIN
YORK
MIDDLESEX
LAMBTON
KENT
ESSEX
OXFORD
BRANT
HALDIMAND-NORFOLK
WENTWORTH
MUSKOKA

Figure 16.1
SOUTHWESTERN RESIDENT GEOLOGIST AREA

EXPLANATION

District Boundary	▨
Location of Ontario Geological Survey Field Projects, 1987:	
Aggregate Assessment, Bruce Peninsula	Ⓐ
Paleozoic Geology, Bruce Peninsula	Ⓑ
Quaternary Geology, Brampton Area	Ⓒ
Quaternary Geology, Port Stanley Area	Ⓓ
Urban Geotechnical Data Bank	Ⓔ
Maps/Reports issued by the Ontario Geological Survey, 1987 (keyed to TABLE .1)	□
Producing Mines, 1987:	●
Gypsum	
Caledonia No. 2 - Domtar Construction Materials Limited	1
Drumbo - Westroc Industries Limited	2
Hagersville - Canadian Gypsum Company Limited	3
Salt	
Goderich - Sifto Salt Division Domtar Inc.	4
Ojibway - Canadian Rock Salt Company Limited	5
Mines under Development, 1987:	◐
Gypsum	
Caledonia No. 3 - Domtar Construction Materials Limited	1
Producing Quarries, 1987:	■
Limestone (L)/Dolostone (D)	
Building Stone	
Adair No. 1 (D) - Adair Marble Quarries Division Arriscraft Corp.	1
Owen Sound (D) - Owen Sound Ledgerock Limited	2
Wiarton (D) - Owen Sound Ledgerock Limited	3
Cement	
St. Marys (L) - St. Marys Cement Company	4
Woodstock (L) - Canada Cement Lafarge Limited	5
Lime	
Beachville E. (L) - BeachviLime Ltd. (Dofasco)	6
Beachville W. (L) - BeachviLime Ltd. (Dofasco)	7
Dundas (D) - Steetley Lime and Aggregates	8
Guelph (D) - Guelph Dolime Limited (BeachviLime Ltd.)	9
Ingersoll (L) - Stelco Inc.	10
McGregor (L) - General Chemical of Canada Limited	11
Shale	
Brick	
Brampton - Brampton Brick Limited	12
Burlington (Tansley) - Canada Brick Limited	13
Milton - Canada Brick Limited	14
Mississauga (Cooksville) - Canada Brick Limited	15
Mississauga (Streetsville C.) - Canada Brick Ltd.	16
Mississauga (Streetsville S.) - Canada Brick Ltd.	17
Brick and Drain Tile	
Arkona - Martin Clay Products	18
Georgetown - Martin Clay Products	19
Brick, Filter Tile, Flower Pots, Flue Liner & Sewer Pipe	
Burlington (Waterdown) - National Sewer Pipe Ltd.	20

rence, Sales Manager, Barringer Research Limited, Rexdale, personal communication, 1985).

Previously, the detection of minor amounts of kaolinite clay mineral in surficial samples of weathered till at Fletcher, Stevenson, Essex, and Kingsville, south of Lake St. Clair (*see* Figure 16.2) had been reported by Brady and Dean (1968). These findings suggest that the kaolinite in the clay size fraction of till in the area south of Lake St. Clair may have been dispersed southward from the soft Bedford clay shale bedrock by the Huron glacial lobe.

In support of these findings, drilling was conducted at four sites in the Sarnia-Windsor area (*see* Figure 16.2: Project 87) over a two week period in March and April, 1987, using a BOA truck-mounted drill rig and a three-man crew supplied by Dominion Soil Investigations Incorporated. In total, nearly 600 feet (182 m) were drilled in Quaternary sediments (556 feet, 169.5 m) and Bedford shale (41 feet, 12.5 m). The Quaternary materials consisted predominantly of clays (470 feet (143 m) of till, glaciolacustine, alluvial); lesser amounts of very hard-to-penetrate interbedded layers of gravelly, sandy silt till and sand and gravel (60 feet, 18 m); and minor, soft silty sand. Samples of the Quaternary sediments were obtained either continuously or at intervals of 5 feet (1.5 m) or more, using 2-foot (0.6 m) or 5-foot (1.5 m) long split-tube samplers with 1.5 to 3 inches (4 to 8 cm) inner diameters inside hollow stem augers. A 34-foot (10.5 m) section of Bedford shale wire-line core with 2-inch (5 cm) diameter was recovered at drill site 2. Strong gas flows were encountered at drill sites 1 and 3 in the interbeds of sand and gravel at the base of the Quaternary sequence. All samples and core are currently stored at the Pleistocene laboratory, Department of Geology, University of Western Ontario, London. A tentative correlation of the Quaternary units encountered at these drill sites and at a previous drill site (Fitzgerald *et al.* 1979) on the southern flank of the Wyoming Moraine, and with other surficial map units in the area (Vagners 1972; Fitzgerald *et al.* 1979; Fitzgerald and Hradsky 1980) is shown in Figure 16.2.

The following are brief summaries of completed and ongoing studies related to this project:

Huron glacial lobe provenance was assigned to various surface till samples from the Windsor-Essex-Kent area south of Lake St. Clair (Figure 16.2) by Jean-Luc G. Arroyas on the basis of heavy mineral analysis (unpublished B.Sc. thesis, University of Western Ontario, London, 1987).

Barringer Research Limited (Paul Lawrence, Sales Manager, Barringer Research Limited, personal communication, 1987) determined, using reflectance spectrometry, moderate or possibly masked kaolinite clay mineral content in 5 out of 12 core samples of Bedford clay shale taken at various depths in the formation at drill sites ARGOR 65-1, O.G.S. KP-24, O.G.S. 82-1, and SWR 87-2. Kaolinite clay mineral is likely present or possibly masked in samples of lower till, basal part of upper till, and central part upper till at drill sites SWR 87-2, -3, and -5 respectively.

The Ontario Research Foundation (Connie Barry, Project Scientist, Glass and Ceramics Centre, personal communication, 1987) completed testing of a 50 to 55 pound (24 kg) composite sample of Bedford clay shale from drill core taken at site SWR 87-2, for potential uses in structural clay products and art pottery.

Greg Brown is presently conducting detailed research, for his M.Sc. thesis at the University of Western Ontario, London, into the origin and distribution of kaolinite clay mineral in the Bedford shale and glacial sediments of the Sarnia-Windsor area, and genesis and provenance of these glacial sediments. This is being done using selected samples of Bedford shale core, lower diamictons at SWR 87-1, -2, and -3 drill sites, and upper diamictons at drillhole SWR 87-5 and other selected surface sites.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

The location of study areas in Southwestern Ontario for which the Ontario Geological Survey published maps and reports during 1987, are outlined in Figure 16.1; the published maps and reports are listed in Table 16.1.

The location of 1987 field investigations by the Ontario Geological Survey in Southwestern Ontario are also shown in Figure 16.1. The following are brief summaries of these projects:

Aggregate Assessment, Bruce Peninsula—Mary Gauvreau and Bob Gorman completed field work for inventory and evaluation of bedrock and surficial sand and gravel aggregate resources in support of 1:50 000 scale mineral land use planning in the Wiarton-Tobermory area, in the townships of Amabel, Albemarle, Eastnor, Lindsay, and St. Edmunds (Gauvreau and Szoke 1987). Samples of sand and gravel, and Guelph and Amabel Formation dolostones, are currently being tested by the Ministry of Transportation at their aggregates laboratory in London.

Paleozoic Geology, Bruce Peninsula—Derek Armstrong and Marc Dubond started, in the township areas of St. Edmunds and Lindsay south of Tobermory, a multiyear project of mapping the Paleozoic geology of the Bruce Peninsula at a scale of 1:50 000 (Armstrong 1987). The objectives of this project are to provide a more precise stratigraphy, facies delineation, and mineral resource evaluation (building-, chemical-, and crushed stone; zinc) of the Colpoy Bay, Wiarton, Eramosa, and Guelph dolostone units. The Paleozoic geology of the Bruce Peninsula area was previously studied by Liberty and Bolton (1971).

Quaternary Geology, Brampton Area—Paul Karrow and John Easton completed 1:50 000 scale mapping of the Quaternary sediments and Paleozoic bedrock exposures in the Brampton Area, started in 1984 (Karrow 1987). This year's field work was carried out in the highly urbanized eastern half of the area including the cities of Brampton and Mississauga, and the western part of Metropolitan Toronto (mainly Etobicoke). The use of old airphotos and locating large trees were substantial aids in urban area mapping of relatively undisturbed surficial geological materials.

Quaternary Geology, Port Stanley Area—Peter Barnett (Geologist, Engineering and Terrain Geology Section, Ontario Geological Survey, Toronto) recorded

Figure 16.2

SOUTHWESTERN RESIDENT GEOLOGIST AREA

KAOLINITIC BEDFORD SHALE (PORT LAMBTON GROUP) AND GLACIAL GEOLOGY OF THE SARNIA – WINDSOR AREA

Figure 2a: Sample Site Locations

EXPLANATION

End Moraines:
- **WM** Wyoming Moraine
- **PHM** Port Huron Moraine
- **EM** Essex Moraine
- **LM** Leamington Moraine
- **BM** Blenheim Moraine

Bedrock Units:

Upper Devonian-Lower Mississippian Port Lambton Group consisting in descending stratigraphic order of:
- Sunbury Formation – black shale
- Berea Formation – sandstone
- Bedford Formation – soft, grey, clayey shale

UDKP Upper Devonian Kettle Point Formation hard, black, silty shale

MD Middle Devonian

H Hamilton Group soft, grey, clayey shale, and limestone

D Dundee Formation limestone

L Lucas Formation limestone, dolomite

A Amherstburg Formation limestone, dolomite

SYMBOLS

– – – Geological boundary, interpreted

——— End moraine

← Huron lobe glacial ice movement direction

⇐ Erie lobe glacial ice movement direction

● Drill hole sample site (this study)

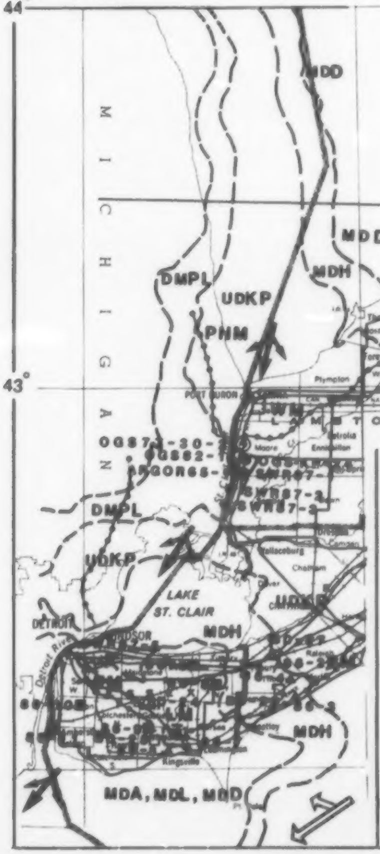
◉ Drill hole site (Fitzgerald et al. 1979)

Surficial Till Sample Sites:

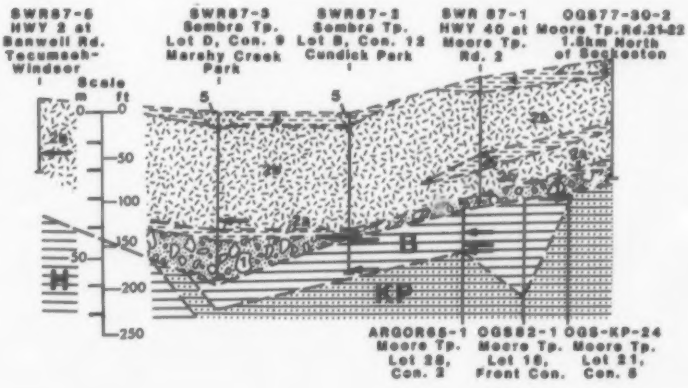
■ With Huron lobe heavy mineral provenance (this study)

▲ With Erie lobe heavy mineral provenance (this study)

□ With minor kaolinite clay mineral (Brady and Dean 1968)



44°
43°
MICHIGAN
ONTARIO
MDD
MDH
DMPL
UDKP
PHM
WM
PORT HURON
Plympton
Petrolia
Moore
Enniskillen
OGS77-30-2
OGS82-1
ARGOR65-1
SWR87-1
SWR87-2
SWR87-3
DMPL
UDKP
LAKE ST. CLAIR
Wallaceburg
Chatham
DETROIT
WINDSOR
Detroit River
MDH
MDA, MDL, MDD
Kingsville



SWR87-5 HWY 2 at Banwell Rd. Tecumseh-Windsor
SWR87-3 Sombra Tp. Lot D, Con. 9 Marshy Creek Park
SWR87-2 Sombra Tp. Lot B, Con. 12 Cundick Park
SWR 87-1 HWY 40 at Moore Tp. Rd. 2
OGS77-30-2 Moore Tp.Rd.21-22 1.5km North of Sockeston
Scale
m
ft
0
0
50
100
150
30
200
250
5
5
2b
2a
1
B
KP
H
ARGOR65-1 Moore Tp. Lot 28, Con. 2
OGS82-1 Moore Tp. Lot 16, Front Con.
OGS-KP-24 Moore Tp. Lot 21, Con. 6

Figure 2b: Drill Hole Stratigraphy

EXPLANATION

QUATERNARY

RECENT

6 Older Alluvium: silty sand

PLEISTOCENE

Late Wisconsinan

Port Huron Stadial

4 Glaciolacustrine silty clay

3 St. Joseph Till: clayey silt till

Port Bruce Stadial

2c Glaciolacustrine clay and silt

2b Gritty clay-clayey silt till

2a Glaciolacustrine clay and silt

Nissouri Stadial

1 Hard, dense, gravelly, sandy-clayey silt till, gravel, sand, silt and clay

MISSISSIPPIAN-DEVONIAN

B Bedford Formation: soft, grey, clayey shale with relatively high Al_2O_3 content (19-24%)

DEVONIAN

KP Kettle Point Formation: hard, black, bituminous, silty shale

H Hamilton Group: soft, grey, clayey shale, and limestone

SYMBOLS

– – – Geological boundary, interpreted

⟵ ⟶ Samples with moderate or possible Kaolinite clay mineral content

TABLE 16.1. MAPS AND REPORTS PERTAINING TO THE SOUTHWESTERN ONTARIO RESIDENT GEOLOGIST AREA PUBLISHED DURING 1987 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports		
OFR 5623	Ontario Geoscience Research Program Grant No. 128, Subsurface Quaternary Stratigraphy of the Kitchener-Waterloo Area Using Borehole Geophysics	R.N. Farvolden, J.P. Greenhouse, P.F. Karrow, P.E. Pehme, L.C. Ross
OFR 5650	Aggregate Resources Inventory of the Town of East Gwillimbury Regional Municipality of York	OGS
OFR 5675	Ontario Geoscience Research Program Grant No. 271 Petrographic and Chemical Properties Affecting Calcining of High Purity Carbonates	P.P. Hudec
Open File Maps		
OFM 72	Mid-Ontario Building Stone Project - Bruce Peninsula, Scale 1:100 000	D.K. Armstrong
OFM 102	Paleozoic Geology of the Northern Bruce Peninsula, Scale 1:50 000	D.K. Armstrong
Preliminary Maps		
P.3072	Quaternary Geology of the Brampton Area, Western Half, Southern Ontario, Scale 1:50 000	P.F. Karrow J. Easton
Coloured Maps		
2508	Quaternary Geology of the Cambridge Area, Southern Ontario, Scale 1:50 000	P.F. Karrow
2509	Quaternary Geology of the Hamilton Area, Southern Ontario, Scale 1:50 000	P.F. Karrow
Report		
Rpt. 255	Quaternary Geology of the Hamilton-Cambridge Area, Southern Ontario	P.F. Karrow
Miscellaneous Papers		
MP 135	An Annotated Bibliography of the Quaternary Geology and History of the Don Valley Brickworks, Toronto	R.I. Kelly P.J. Barnett R.J. Delorme
MP 136	Geoscience Research Grant Program, Summary of Research, 1986-1987	OGS
MP 137	Summary of Field Work and Other Activities, 1987, by the Ontario Geological Survey	OGS

and sampled a 158-foot (48 m) thick Middle Wisconsinan and older Quaternary sediment sequence overlying Middle Devonian Dundee Formation limestone at a borehole site in the Catfish Creek Valley between Aylmer and St. Thomas. This project is in support of Quaternary stratigraphic studies in the Port Stanley area previously reported on by Aleksis Dreimanis and Peter Barnett (1985). Oil and gas shows were encountered at and near the top of the Dundee Formation.

Urban Geotechnical Data Bank—Ross Kelly described and sampled 60 natural exposures and excavations in the Metropolitan Toronto area to provide reference Quaternary geological and geotechnical information for correlation with records of adjacent boreholes (Kelly 1987).

RESEARCH BY OTHER AGENCIES

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

The following academic studies pertaining to Southwestern Ontario received Ontario Geoscience Research Grants for 1987-1988:

Brock University, St. Catharines

S.J. Haynes, Grant 319—Gypsum Deposits of Southern Ontario.

Queen's University, Kingston

L. Smith, Grant 295—Karst Episodes and Permeability Development, Silurian Reef Reservoires, Southwestern Ontario.

University of Guelph

J.L. Campbell, Grant 301—Software Development for Micro-PIXE Analysis of Mineralogical Specimens.

University of Toronto

R.C. Bailey, Grant 290—Improved Computer Interpretation of Gravity and Magnetic Data.

University of Waterloo

S. Frape, Grant 249—Geochemical Studies of Formation Waters: Paleozoic Strata, Southwestern Ontario.

P.F. Karrow, J.P. Greenhouse, and M.B. Dussault, Grant 312—Subsurface Quaternary Stratigraphy Using Borehole Geophysics.

B.G. Warner and D.C. Nobes, Grant 310—Application of Surface Radar Sounding Techniques in Peatland Inventories, Southern Ontario.

University of Western Ontario, London

S. Hicock, Grant 307—Light Minerals and Specialty Sand in Southern Ontario.

UNIVERSITY THESES

S. Ansell, University of Western Ontario, London, is completing a B.Sc. thesis on the lithology, structure, and stratigraphy of upper clayey diamicton encountered in three boreholes, in the Courtright-Port Lambton area.

P.J. Barnett, completed in 1987, a Ph.D. thesis entitled "Quaternary Stratigraphy and Sedimentology, North Central Shore Lake Erie, Ontario, Canada" at the University of Waterloo.

J. Bisson, University of Western Ontario, London, is completing a M.Sc. thesis on the behaviour of seismic waves in a near-surface gravel deposit at Pinehurst, Harwich Township.

G.O. Brown, University of Western Ontario, London, is completing a M.Sc. thesis on the Bedford Formation and associated Quaternary glacial sediments, Lake St. Clair Region, Southern Ontario.

J. Butler, University of Western Ontario, London, is completing a M.Sc. thesis on silica sand origin and dispersal, Huron and Georgian Bay areas.

B. Hart, University of Western Ontario, London, is completing a M.Sc. thesis on the origin and depositional environment of intratill glaciofluvial sediments within the Catfish Creek Drift, Bradtville.

C. Lawton, University of Western Ontario, London, is completing a M.Sc. thesis on Late Wisconsinan ice marginal events and facies deposition along the northern shore of Lake Erie.

M. McCrae, University of Western Ontario, London, is completing a B.Sc. thesis on subglaciofluvial and till deposition near Sparta.

M. Rutka, completed in 1987, a M.Sc. thesis entitled "Sedimentology of the Whirlpool Formation Sandstone, Niagara Gorge" at McMaster University, Hamilton.

MINING ACTIVITIES

The locations of all operating underground mines and selected operating quarries in the Southwestern District are shown in Figure 16.1.

Rock Salt is extracted from the Salina Formation by underground mining methods at Goderich and Windsor. At the Goderich Mine, Domtar Incorporated uses a modified room-and-pillar design in the 23 m thick A-2 Unit bed at a depth of 537 m. At the Ojibway Mine in Windsor, The Canadian Rock Salt Company Limited employs a conventional room-and-pillar method in the 7.5 m thick Middle F Unit bed at a depth of 297 m. Rock salt is primarily used in de-icing (80 to 85 percent), in chloralkali manufacture (12 to 20 percent), and in minor miscellaneous markets.

Gypsum is extracted from the Salina Formation by underground room-and-pillar methods at Caledonia, Hagersville, and Drumbo. Gypsum production is chiefly for the manufacture of wallboard. At the Caledonia No. 2 Mine, Domtar Incorporated mines a 2.5 m thick gypsum bed, possibly in the A-1 or A-2 Unit, at a depth of 25 m. The company announced plans to develop a new mine at Caledonia for full production in 1990, as reserves at the current mine will be depleted within 3 to 4 years.

Southward, the Canadian Gypsum Company Limited mines an approximately 1 m thick gypsum bed, possibly in the E Unit, at a depth of 30 m, north of Hagersville.

Westward, Westroc Industries Limited mines a 1.7 m thick gypsum bed, possibly in the A-1 or A-2 Unit, at a much greater depth of 116 m, near Drumbo.

Adair Marble Quarries Division of Arriscraft Corporation quarries 10 t size dimension stone blocks from blue-grey mottled, thick-bedded Amabel Formation dolostone (Wiarton-Colpoy Member) near Hope Bay in the Bruce Peninsula. The company carried out on-site exploration for the development of a second Adair Quarry.

Owen Sound Ledgerock Limited quarries thin- to medium- bedded Eramosa Member dolostone at one operation near Owen Sound and another near Wiarton, for the production of flagstone, drywall stone, patio stone, hearths, mantels, sills, and Eramosa Marble. The company experienced a great increase in demand for Eramosa Marble and therefore installed a new marble plant at its Owen Sound operation.

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17. Petroleum Resources Section, Ministry of Natural Resources—1987

R.A. Trevail[1,2]

[1]Chief Geologist, Petroleum Resources Section, Ontario Ministry of Natural Resources, London

[2]Regional Geologist, Ontario Ministry of Natural Resources, London

INTRODUCTION

The Petroleum Resources Section, Southwestern Region, Ministry of Natural Resources, endeavors to deliver a program which not only encourages exploration for and development of Ontario's petroleum resources but also maintains operations level control on industry activity. Geological program staff include Bob Trevail, fulfilling the dual role of Chief Geologist, Petroleum Resources Section and Regional Geologist, Southwestern Region; Terry Carter, Senior Petroleum Geologist; Mahendra Narain, Aggregate Resources Geologist; Malcolm Campbell, Petroleum Resources Lab Technician; Debra Parker, Resource Geologist; and Marg Bernardo, Clerk-Typist. Other staff employed during the year include Peter Dollar and Andre LaFlamme (Geological Assistants), Susan Brown (Clerk-Typist), Laura Belous (Experience '87), and Rich Kilpatrick, Ray Ripplinger, and James Alexander (Unemployment Insurance Commission, Section 38).

Engineering and administrative staff include Pentti Palonen, Mineral Resources Co-ordinator; Rudy Rybansky, Offshore Engineer; Ernie Habib, Onshore Engineer; Karen McLeod, Petroleum Engineering Technologist; Peter Wright, Administrative Assistant; Cathy Hesselmans, Systems Analyst; Frances McKeon, Data Processing Technician; Ian Cameron, Map Drafter; Arlene Hawley, Program Secretary; and Brigitte Davidson, Clerk-Typist. Contract staff are Cara Rose, Intermediate Map Drafter and Karen Aubin, Data Processing Technician.

Petroleum Resources Inspectors, responsible for the enforcement of the Petroleum Resources Act and regulations made thereunder are located in the Simcoe and Chatham District offices. Mike Hunter, Deputy Chief Inspector, and Bob Lewis are located in Simcoe. Bob Sealey and Rod Corea operate out of the Chatham office.

PROGRAM ACTIVITY

GEOLOGICAL PROGRAM

Geological staff continued their efforts to encourage investment in Ontario's oil and gas industry by providing geological advice and information to various private individuals and companies, government agencies, and academic institutions. Interaction with individuals from Michigan, Alberta, Ohio, Texas, Pennsylvania, and Colorado resulted in relatively substantial investments from out-of-province of both time and money expended in developing prospects, acquiring land, and drilling wells. While the number of wells drilled lagged behind last year's pace, the quality of drillable prospects has improved considerably over the past two years.

Work continued on a long-term project investigating the potential of remote sensing methods for hydrocarbon exploration in Ontario. Current participants are Bob Trevail, Vernon Singhroy, Senior Research Engineer, Ontario Centre for Remote Sensing, John Fischer, Staff Scientist, Ontario Centre for Remote Sensing, and Ray Lett, Chief Geologist, Barringer Magenta Limited. Data gathered, compiled, and analyzed to date was derived from various multispectral measurements of the spectral response of soils and vegetation, geochemical analyses of various soil types, and analyses of soil-gases. Preliminary results, presented at the Eleventh Canadian Symposium on Remote Sensing held in Waterloo in June, 1987, indicate that soils with high soil-gas geochemical values demonstrate greater variance in reflectance within the 400 ηm to 1100 ηm range than soils with lower soil-gas geochemical values. As the concentration of major elements increases, so does the degree of spectral variation.

Data indicate a relationship exists between reflectance from corn leaves and soil-type rather than soil-gas concentration and reflectance. This implies no relationship exists between spectral values of corn leaves and hydrocarbon microseepages.

Further work is currently ongoing to examine in more detail the bulk soil geochemistry to determine if soil-gases affect soil composition.

Three technical papers were presented by section staff in 1987. Trevail presented a paper, co-authored by Leigh Smith, Professor, Department of Geological Sciences, Queen's University, at the Canadian Reef Symposium held January 23-30, 1987. The paper, entitled "Cratonic Tectonism as Control of Spatial Distribution and Form of Silurian Pinnacle and Platform Reefs, Southwestern Ontario", proposed that two forms of regional tectonism were controlling influences on the spatial distribution and form of Silurian reefs in southwestern Ontario. Differential rates of subsidence controlled the location of the major facies belts (basin, shelf, bank) and therefore the location in a regional context of both pinnacle and patch reefs. Reactivation of a pre-existing fracture framework provided local control on the location and form of individual pinnacle and patch reefs.

A second paper presented by Trevail, entitled "Remote Sensing Techniques for Delineation of Major Structural Elements of the Paleozoic Bedrock, Southwestern Ontario", was co-authored by Vern Singhroy, Ontario Centre for Remote Sensing. The paper, given at the 30th Conference of the International Association for Great Lakes Research in May, 1987, described how various remote sensing techniques are useful to detect the surface expression of deep-seated faults which play a major role in localizing hydrocarbon reservoirs, areas of salt dissolution, and directions and rates of subsurface fluid flow.

A paper describing similarities between Paleozoic stratigraphic sequences in Southwestern Ontario and Proterozoic strata of the Grenville Supergroup was presented by Terry Carter, Senior Petroleum Geologist, at the 26th Annual Convention of the Ontario Petroleum Institute. The paper demonstrated the value of such comparisons for interpretation of stratigraphic and sedimentologic relationships in the metamorphosed supracrustal rocks of the Grenville Supergroup. It also demonstrated the potential for discovery of stratiform carbonate-hosted zinc-lead deposits in Southwestern Ontario, similar to those in the Grenville marbles, and may provide some insights into the genesis of this type of mineral deposit.

NEW PETROLEUM RESOURCES LABORATORY

The Petroleum Resources Laboratory was moved, on July 6, to new facilities, located at 659 Exeter Road in the south end of London, after 16 years in the downtown area of the city. The new 660 m^2 building was constructed, at a cost of $400 000, south of the Ministry of Natural Resources Southwestern Region, main office structure. Many refinements were made in the layout of public, office, and storage areas, to provide improved service to clients. Core and sample examination areas are amalgamated into one large area, and include six semiprivate work stations for use by consultants, industry personnel, and the general public.

The Petroleum Resources Laboratory is an integral part of the provincial Petroleum Resources program. Activities are directed toward encouraging investment in exploration and development of Ontario's petroleum resources. Core and drill-cuttings samples from wells penetrating the Phanerozoic strata of Southwestern Ontario (onshore and offshore), the Ottawa Lowlands and the Ontario part (onshore) of the Hudson Bay Lowlands, are available for examination at the Lab. More than 45 000 metres of continuous core from more than 800 wells, as well as drill-cuttings samples from approximately 10 000 wells, are stored in the Petroleum Resources Laboratory. The collection of cores and samples in the repository originated mainly from oil and gas exploration and development drilling by private companies in southwestern Ontario; however, drilling programs by the Ministry of Natural Resources and Ontario Hydro are also represented.

In support of the core and drill-cuttings samples, well files containing drillers' logs, geophysical logs, core analyses, fluid analyses, and other interpretative data related to approximately 22 000 wells are available. Well location and current status maps for land (scale 1:30 000) and Lake Erie (scale 1:50 000) are available from the Petroleum Resources Section. The Lab has a number of quality binocular microscopes on hand, plus other supporting equipment which patrons may reserve for use by calling prior to their visit. A recent addition to our equipment is a Nikon Labophot POL trinocular petrographic microscope.

OIL-FIELD BRINE DISPOSAL

Disposal of oil-field brine is a long-standing problem faced by operators, particularly in the old Devonian fields such as Petrolia, Oil Springs, and Bothwell–Thamesville, discovered in the 1850s and 1870s. The preferred method of disposal is to return brine to the Detroit River Group, which contains a zone of relatively high porosity and permeability. This zone will accept large quantities of brine using only hydrostatic head as a driving mechanism. Over the past year, operators in the Bothwell–Thamesville area were encouraged by the inspection staff to discontinue their current surface disposal practices, and to move towards the more preferred method. The inspectors efforts are meeting with success, as a number of the operators are drilling properly constructed oil-field brine disposal wells.

Similar efforts are currently underway to encourage operators in the Petrolia and Oil Springs pools to switch to proper underground disposal of produced oil-field brine.

SPACING UNIT APPLICATIONS

The Ministry of Natural Resources embarked on a new initiative of stricter enforcement of Section 12, Ontario Regulation 752, requiring applications for the establishment of spacing units to be submitted following the discovery of a pool capable of producing oil or gas. In the past, non-application has resulted in unequal distribution of royalties, poor production practices, and over-drilling of some reservoirs. As a consequence of this enforcement initiative, industry has submitted approximately 25 applications for consideration and the number of voluntary unitization agreements has increased.

ONTARIO PETROLEUM INSTITUTE

Section staff played a major role in organizing and co-ordinating the 26th Annual Conference of the Ontario Petroleum Institute, held October 25 to 27, 1987, in Toronto. Two days of technical talks highlighted the conference, and subjects varying from drilling and exploration geology to finance and hydrocarbon storage were presented by a group of Canadian and American industry specialists.

Terry Carter and Steve Colquhoun (District Geologist, The Consumers' Gas Company Ltd.) led a field trip through the Niagara peninsula with stops at Port Colbourne, to visit the drillship Telesis, and at the Power Glen access road, to examine the Silurian section from the Whirlpool Formation up to the Goat Island Formation.

Of particular interest to many delegates was the talk presented by Ray Pichette, Manager, Fuel Minerals Section, Ministry of Natural Resources, which focused on the overall objectives of the proposed "Oil, Gas, and Brine Resources Act". He discussed six primary objectives of this proposed legislation, which are:

1. to provide for the economic, orderly, and efficient development of oil, gas, and brine resources of Ontario;
2. to effect conservation and prevent waste of such resouces;
3. to secure the observance of safe and efficient practices related to oil and gas drilling, production, and brine disposal;
4. to protect correlative rights;

5. to streamline government procedures and expedite tribunal hearings in the future problem cases; and
6. to make Crown Lands of Ontario available for exploration and development.

Dr. Thomas Gold, formerly Director, Center for Radiophysics and Space Research, Cornell University, presented information on his deep-earth-gas hypothesis. Gold believes non-organic methane, incorporated as a primordial material deep within the mantle when the earth was formed, may be continually released from great depths and may constitute an economic resource if it is trapped in a suitable reservoir. He also discussed the preliminary results from the deep well drilled in the Siljan Ring meteor crater located in Sweden. Although the well was not a commercial discovery, the presence of light hydrocarbon gases offered encouragement.

ONTARIO ENERGY BOARD—O.E.B.

Staff of the Petroleum Resources Section participated in one formal hearing, O.E.B. 135, which dealt with an application by The Consumers' Gas Company Ltd., Pembina Exploration Limited, and 691923 Ontario Ltd. (also known as Devran Petroleum Ltd.), for an order requiring and regulating the joining of various interests in the Hillman Pool. This particular procedure, known as unitization, provides for the orderly development of drilling and operating of wells, the designation of management, and the apportionment of both the costs and benefits of such drilling and operations. Application for a hearing was made March 10, 1987. Staff of the Petroleum Resources Section were asked by the Board to review the applicants' pre-filed evidence, and to provide expert witness testimony at the hearing.

The hearing was held in Windsor on October 20 and 21, and concluded in Toronto on October 22. Five witnesses testified on behalf of the applicant. R.M. Rybansky and R.A. Trevail presented evidence on behalf of the Ministry of Natural Resources. Counsel for two intervenors did not call any witnesses to support their intervention and three landowners/intervenors commented on the application on their own behalf.

According to the applicant, the most compelling reason for unitization at this time was to overcome the inequitable distribution of landowner royalties occuring under Ontario Regulation 1/85. The proposed royalty division was based on the volume of reserves underlying each royalty interest owner's land, and would result in 58 landowners sharing the royalty monies rather than 35, as under Ontario Regulation 1/85.

While the applicant supported this view throughout the hearing, Petroleum Resources staff presented other, and equally important, reasons for unitization. Such reasons include increased hydrocarbon recovery, reduced operating costs, and savings on investment—all of which lead to conservation of oil and gas resources and more efficient extraction of the resource. Unitization would enable centralized operations and eliminate the need for excessive and wasteful drilling.

The main intervenors argued that unitization would greatly reduce their royalty income and thus be an expropriation of rights granted to them under their respective land deeds. Counsel for the intervenors did not call any witnesses to support his position, but did vigorously cross-examine both the applicants' and Ministry of Natural Resources' witnesses. At the time of writing, the Ontario Energy Board had not yet rendered a decision. One is expected by the end of December, 1987, or early in 1988.

In other O.E.B. related business, a number of drilling applications were referred to the Board because the proposed well locations were within the boundaries of designated gas storage areas. In four cases, the wells were shallower pool tests, undertaken to evaluate potential reservoirs in the Dundee Formation and Detroit River Group. Union Gas Ltd. applied to drill a number of observation wells into various gas storage pools in order to monitor injection/withdrawal performance. In a matter related to the Bickford hearing held in 1986 (Trevail *et al.*, 1987), Magder Enterprises Ltd. reached a settlement with Union Gas Ltd. concerning compensation issues arising from the Board's decision that the Sombra 4-9-XII well was, in fact, in communication with the Bickford Pool. Therefore, a compensation hearing before the Board was not necessary.

EXPLORATION AND DEVELOPMENT ACTIVITY

DRILLING ACTIVITY

Drilling activity in 1986 decreased drastically from 1985, dropping 42 percent to 113 wells. This total is composed of 60 exploratory, 29 development, and 24 service wells. Forty-five percent of the exploratory wells and 83 percent of the development wells were successfully completed as oil and/or gas producers. Only 4 wells were drilled in Lake Erie and all were completed as gas producers. Further details on 1986 activity can be found in Carter and Campbell (1987).

Statistics available showed that 26 exploratory, 26 development, and 26 service wells had been drilled to November 30, 1987. Exploratory drilling resulted in 3 gas wells, 6 oil wells, 16 dry holes, and 1 suspended well, for a total of 18 583.7 m. Seven gas wells, 9 oil wells, 9 dry holes, and 1 suspended well resulted from development drilling. The 26 service wells are comprised of 4 oil-field brine disposal wells, 6 brine wells, 3 stratigraphic tests, 8 natural gas storage wells, 4 liquid petroleum gas (LPG) storage wells, and 1 observation well. Further details pertaining to drilling activity are available in Table 17.1. Figure 17.1 shows the location of those wells successfully completed as gas and/or oil producers, gas storage, LPG storage, and brine wells.

Drilling in Lake Erie increased by 2 wells to 6 this year, resulting in 4 gas producers and 2 dry holes. Almost 60 percent of Crown Lands on Lake Erie are disposed of, through Licence of Occupation (268 539 ha) and Production Lease (347 466 ha), generating income to the Crown in the amount of $668 092. Currently 422 160 ha are available for licencing.

Once again in 1987, exploration for, and development of deep reservoirs in the Middle Ordovician

TABLE 17.1

Summary of Wells Drilled in 1987

County	Township	Exploratory						Development						Service *			
		Gas	Oil	Dry	Susp	Total Wells	Total Metres	Gas	Oil	Dry	Susp	Total Wells	Total Metres	Total Wells	Total Metres	Total Wells	Total Metres
ESSEX	Anderdon	1				1	1125.0							2	743.7	3	1868.7
	Colchester North			1		1	1074.0									1	1074.0
	Gosfield South		1			1	1048.0									1	1048.0
	Maidstone		1	1		2	2243.0			1		1	1120.0			3	3363.0
	Mersea		1			1	1089.0		2			2	1745.3			3	2834.3
	Sandwich South			1		1	485.5									1	485.5
	Sandwich West													3	1064.4	3	1064.4
HURON	Stanley			2		2	1227.7									2	1227.7
KENT	Camden			1		1	128.3									1	128.3
	Camden Gore			3		3	857.7									3	857.7
	Chatham								1	2		3	1627.4			3	1627.4
	Romney		1			1	1105.0									1	1105.0
	Tilbury East		2		1	3	3345.4									3	3345.4
	Zone									1		1	137.2	1	191.4	2	328.6
LAMBTON	Dawn			1		1	615.0		3			3	1763.4	6	2912.5	10	5290.9
	Enniskillen			3		3	1447.1							1	184.4	4	1631.5
	Moore			1		1	799.0							8	5490.5	9	6289.5
	Sarnia													2	1356.0	2	1356.0
	Sombra													2	1293.0	2	1293.0
	Warwick								3	2	1	6	807.3	1	182.9	7	990.2
MIDDLESEX	McGillivray			1		1	567.0									1	567.0
	Metcalfe			1		1	143.3									1	143.3
NORFOLK	Charlotteville							1				1	408.7			1	408.7
	Houghton							1				1	446.5			1	446.5
	North Walsingham	1				1	402.3	1				1	427.0			2	829.3
OXFORD	Blandford	1				1	882.4									1	882.4
	Blenheim									1		1	894.6			1	894.6
LAND TOTAL		3	6	16	1	26	18584.7	3	9	7	1	20	9377.4	26	13418.8	72	41380.9
LAKE ERIE								4		2		6	2270.2			6	2270.2
GRAND TOTAL		3	6	16	1	26	18584.7	7	9	9	1	26	11647.6	26	13418.8	** 78	43651.1

Service Wells Include:
4 Disposal Wells
6 Brine Wells
3 Stratigraphic Tests
8 Gas Storage Wells
4 Liquified Petroleum Gas (LPG) Wells
1 Observation Well

** 3 Lost Holes of 466.2 Metres are not Included in This Total.

carbonate rocks of the Trenton and Black River Groups in Essex and Kent counties proved to be the most popular play. Four significant discoveries (*see* Table 17.2), 3 operated by The Consumers' Gas Company Ltd. and 1 by Ram Petroleums Ltd., continued the string of successes operators have had in the area since 1983.

OIL AND GAS PRODUCTION

There were 1069 active oil wells and 1246 active gas wells operating in the province in 1986. Final production figures for 1986 indicate oil production totalled 135 816 m^3, an increase of 20 percent from 1985. The Hillman Pool was the largest single producing entity, contributing 32.3 percent (43 825 m^3) to the provincial total. Gas production for 1986 amounted to 532 109 10^3 m^3, representing a decrease of 9.6 percent from 1985. Seventy-five percent of provincial natural gas production was from pools underlying Lake Erie. Tables 17.3 and 17.4 summarize gas and oil production on a pool basis for the period 1979 through 1986. Preliminary figures only, are available for 1987 production. To the end of November, 1987, cumulative oil production was 23 167 m^3 of which the Hillman Pool had produced 36 985 m^3 (30 %). Average price paid for oil in November was $152.97 per cubic metre ($24.32 per barrel). Projected production for the year is 134 000 m^3, based on current production rates.

Natural gas production to the end of October was 424 573 10^3 m^3 split between onshore production of 100 694 10^3 m^3 (24%) and Lake Erie production of 323 879 10^3 m^3 (76%). Projected gas production for the year is 509 500 10^3 m^3 based on current production rates. This represents a decrease of 4 percent from 1986 and can be attributed to normal rates of production decline coupled with the lack of signifi-

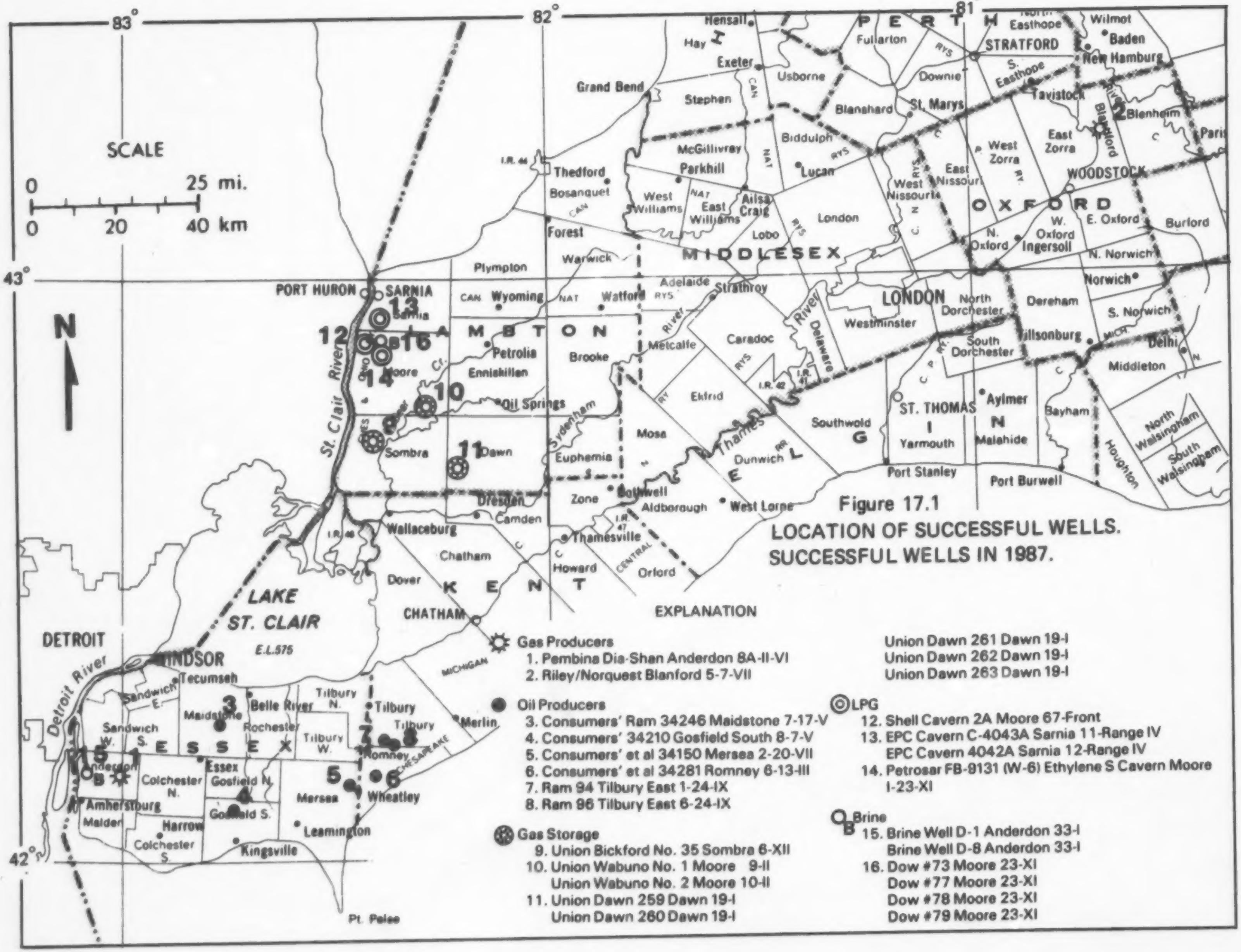
SCALE
0 25 mi.
0 20 40 km
N
83°
82°
81°
43°
42°
DETROIT
PORT HURON
SARNIA
WINDSOR
CHATHAM
LONDON
STRATFORD
WOODSTOCK
ST. THOMAS
LAKE ST. CLAIR
E.L.575
St. Clair River
Detroit River
Thames
Sydenham
MIDDLESEX
OXFORD
PERTH
ESSEX
KENT
LAMBTON
ELGIN
Plympton
Wyoming
Petrolia
Enniskillen
Oil Springs
Moore
Sombra
Dawn
Brooke
Euphemia
Dresden
Camden
Wallaceburg
Dover
Chatham
Tilbury
Romney
Wheatley
Mersea
Leamington
Kingsville
Gosfield N.
Gosfield S.
Colchester N.
Colchester S.
Harrow
Amherstburg
Malden
Anderdon
Sandwich W.
Sandwich S.
Sandwich E.
Tecumseh
Maidstone
Rochester
Belle River
Essex
Merlin
Pt. Pelee
Grand Bend
Thedford
Bosanquet
Forest
Warwick
Watford
Adelaide
Strathroy
Metcalfe
Caradoc
Ekfrid
Mosa
Zone
Bothwell
Thamesville
Howard
Orford
Aldborough
West Lorne
Dunwich
Southwold
Yarmouth
Port Stanley
Aylmer
Malahide
Bayham
Port Burwell
Houghton
North Walsingham
South Walsingham
Middleton
Delhi
Tillsonburg
Dereham
South Dorchester
North Dorchester
Westminster
Delaware
Lobo
London
Lucan
Biddulph
McGillivray
Parkhill
West Williams
East Williams
Ailsa Craig
Stephen
Usborne
Hay
Hensall
Exeter
Blanshard
St. Marys
Fullarton
Downie
West Nissouri
East Nissouri
West Zorra
East Zorra
S. Easthope
North Easthope
Tavistock
Blandford
Blenheim
Wilmot
Baden
New Hamburg
Paris
N. Oxford
W. Oxford
E. Oxford
Ingersoll
Burford
Norwich
N. Norwich
S. Norwich
EXPLANATION
Gas Producers
1. Pembina Dia-Shan Anderdon 8A-II-VI
2. Riley/Norquest Blanford 5-7-VII
Oil Producers
3. Consumers' Ram 34246 Maidstone 7-17-V
4. Consumers' 34210 Gosfield South 8-7-V
5. Consumers' et al 34150 Mersea 2-20-VII
6. Consumers' et al 34281 Romney 6-13-III
7. Ram 94 Tilbury East 1-24-IX
8. Ram 96 Tilbury East 6-24-IX
Gas Storage
9. Union Bickford No. 35 Sombra 6-XII
10. Union Wabuno No. 1 Moore 9-II
Union Wabuno No. 2 Moore 10-II
11. Union Dawn 259 Dawn 19-I
Union Dawn 260 Dawn 19-I
Union Dawn 261 Dawn 19-I
Union Dawn 262 Dawn 19-I
Union Dawn 263 Dawn 19-I
LPG
12. Shell Cavern 2A Moore 67-Front
13. EPC Cavern C-4043A Sarnia 11-Range IV
EPC Cavern 4042A Sarnia 12-Range IV
14. Petrosar FB-9131 (W-6) Ethylene S Cavern Moore I-23-XI
Brine
15. Brine Well D-1 Anderdon 33-I
Brine Well D-8 Anderdon 33-I
16. Dow #73 Moore 23-XI
Dow #77 Moore 23-XI
Dow #78 Moore 23-XI
Dow #79 Moore 23-XI

Figure 17.1

LOCATION OF SUCCESSFUL WELLS.
SUCCESSFUL WELLS IN 1987.

TABLE 17.2 Significant Discoveries - Essex and Kent Counties, 1987

1	Well Name:	Consumers' 34210 Gosfield South 8-7-V
	Operator:	The Consumers' Gas Company Ltd.
	County:	Essex
	Township:	Gosfield South
	Tract:	8
	Lot:	7
	Concession:	V
	Drilling Completed:	1987 01 30
	Results:	Trenton (Ordovician) oil producer
	Total Depth:	1048 metres
2	Well Name:	Ram # 94 Tilbury East 1-24-IX
	Operator:	Ram Petroleums Ltd.
	County:	Kent
	Township:	Tilbury East
	Tract:	1
	Lot:	24
	Concession:	IX
	Drilling Completed:	1987 01 30
	Results:	Trenton (Ordovician) oil producer
	Total Depth:	1115 metres
3	Well Name:	Consumers/Ram 34246 Maidstone 7-17-V
	Operator:	The Consumers' Gas Company Ltd.
	County:	Essex
	Township:	Maidstone
	Tract:	7
	Lot:	17
	Concession:	V
	Drilling Completed:	1987 02 27
	Results:	Trenton (Ordovician) oil producer
	Total Depth:	1120 metres
4	Well Name:	Consumers' et al 34281 Romney 6-13-III
	Operator:	The Consumers' Gas Company Ltd.
	County:	Kent
	Township:	Romney
	Tract:	6
	Lot:	13
	Concession:	III
	Drilling Completed:	1987 07 30
	Results:	Trenton (Ordovician) oil producer
	Total Depth:	1105 metres

cant new discoveries of gas within the past two years.

Reports completed by Bailey Geological Services Ltd. and Cairnlins Petroleum Services as part of the Province's Hydrocarbon Energy Resources Program indicate significant reservoirs of hydrocarbon remain to be found in Ontario. Recent Ordovician discoveries attests to the validity of these projections. Table 17.5 lists the total calculated potential hydrocarbon reserves to be found in southern Ontario. These values were calculated by determining a hydrocarbon yield per unit volume factor for a productive formation and applying that factor to the sediment volume as determined from the pertinent isopach maps. By subtracting production to the end of 1986 from potential reserves the remaining, as of yet undiscovered, reserves can be determined. Remaining potential oil reserves of 38 597 10^3 m^3 and remaining potential gas reserves of 47 240 10^6 m^3 make Ontario an attractive area in which to invest exploration and development dollars.

CANADIAN EXPLORATION AND DEVELOPMENT INCENTIVE PROGRAM

Responding to the plight and concerns of the Canadian oil and gas industry following the devastating collapse of oil prices in early 1986, The Honourable Marcel Masse, Minister of Energy, Mines and Resources, Canada, announced the creation of the Canadian Exploration and Development Incentive Program (CEDIP) on March 25, 1987. The program, which commenced on April 1, 1987, provides for cash incentives equal to 33 1/3 percent of eligible expenses, up to a maximum annual limit of $10 million of eligible expenses per claimant per year.

The main objectives of the program are to provide assistance to the petroleum industry, and to promote economic development in the regions of Canada that depend largely upon oil and gas resources for their livelihood. The program covers exploration and development wells, including: site preparation, drilling, completions, and well conversions and recompletions. In addition, the collection and processing of field data for geological, geophysical, and geochemical programs are covered. With respect to geological programs, at this time only those which are directed solely toward field work (i.e. outcrop studies) are eligible for consideration under this program. Regional subsurface studies utilizing information at the Petroleum Resources Laboratory are not eligible.

Of particular interest to those companies working in Ontario is the provision which allows them to attract investment funding via flow-through shares by allowing tax incentives to pass to the investors.

TABLE 17.3

ONTARIO NATURAL GAS PRODUCTION 1979 - 1986
(1000 cubic metres)

COUNTY	POOL NAMES	1979	1980	1981	1982	1983	1984	1985	1986
BRANT	Brant	568.2	439.7	485.6	351.6	382.3	407.4	394.3	382.1
	Subtotal	568.2	439.7	485.6	351.6	382.3	407.4	394.3	382.1
ELGIN	Aldborough 4-20-VII	0.0	22.3	77.6	351.2	18.3	2.3	130.7	882.9
	Camel	331.7	246.1	316.4	363.8	318.0	291.9	280.4	278.7
	Townline	2265.1	2311.0	2311.0	2246.4	2021.7	1162.7	659.6	165.1
	Subtotal	2596.8	2579.6	2705.0	2961.4	2358.0	1456.9	1070.7	1326.7
HALDIMAND	Haldimand	1844.8	1485.8	2476.2	1969.3	1822.9	1660.1	1614.9	1845.3
	Subtotal	1844.8	1485.8	2476.2	1969.3	1822.9	1660.1	1614.9	1845.3
HURON	Bayfield	0.0	0.0	0.0	0.0	1705.9	1525.9	587.0	43.1
	Stanley 4-7-XI	0.0	0.0	0.0	0.0	0.0	0.0	2738.5	7224.8
	Tipperary	0.0	325.5	1864.5	1451.8	1013.1	1003.1	843.6	1042.5
	Tipperary South	0.0	57.7	1504.1	2389.1	1191.6	936.5	910.8	696.1
	Subtotal	0.0	383.2	3368.6	3840.9	3910.6	3465.5	5079.9	9006.5
KENT	Botany	67.3	95.7	936.1	1029.1	631.4	1023.2	875.6	880.6
	Camden 1-11-XIV Gore	0.0	0.0	0.0	0.0	0.0	0.0	1083.2	238.0
	Camden Gore	1704.6	1692.1	1281.5	1369.3	1449.4	1447.1	1487.8	1433.2
	Chatham	1314.4	1422.4	1002.5	1163.9	1268.5	1038.7	1328.1	1286.1
	Baylen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8
	Dover	1480.7	3238.5	1319.8	1494.9	1289.4	1112.2	1277.8	1388.1
	Dover 7-5-V E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	227.8
	Dover 7-10-VI E	0.0	297.4	44.6	47.3	112.4	103.4	107.1	31.5
	D'Clute	253.5	202.8	283.5	223.4	209.6	265.2	213.6	246.4
	Morpeth	778.3	881.6	843.3	701.8	786.2	722.3	698.2	481.6
	Tilbury	7248.3	7916.8	8868.1	6817.9	6971.6	6044.2	5766.7	5910.1
	Wolfe	109.5	122.4	130.5	112.5	169.8	146.4	129.8	193.2
	Zone	1949.8	1808.5	1853.2	1971.1	1943.1	1752.2	1588.2	1881.4
	Subtotal	14873.4	17678.2	16263.1	14931.2	14718.4	13644.9	14553.1	14408.8
LAMBTON	Avonry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	832.9
	Becher East	771.5	848.2	314.9	0.0	14.6	0.0	0.0	0.0
	Becher West	1543.2	1335.6	1342.5	958.6	1066.2	1689.4	1337.1	1513.1
	Brigden	1568.8	1659.8	1317.3	1051.4	915.2	876.2	770.5	728.9
	Charlemont	6.0	179.1	202.2	135.9	97.2	134.9	136.6	290.6
	Corunna	0.0	0.0	0.0	141.6	176.2	183.4	142.0	207.0
	Coveny	0.0	184.1	8064.5	3911.6	2505.7	902.1	2226.1	2478.9
	Cromar	1390.3	951.1	871.6	484.6	262.5	839.7	531.5	0.0
	Dawn 1	1060.1	687.6	638.1	735.0	583.7	971.3	427.5	1258.1
	Dawn 1-27-VI	0.0	0.0	0.0	0.0	0.0	0.0	15862.4	19353.3
	Dawn 5-29-IX	0.0	885.9	1338.0	1297.0	325.3	0.0	0.0	0.0
	Dawn 5-30-IV	0.0	453.8	34.8	158.5	353.4	339.2	446.1	301.6
	Dawn 7-28-V	0.0	3316.9	5766.4	2685.8	3266.1	2444.3	1360.3	2334.9
	Dawn Misc.	2136.2	2908.1	3840.2	2442.5	2602.8	2116.0	929.6	2108.1
	Edys Mills	0.0	0.0	0.0	1756.3	2835.0	3838.9	3353.1	3830.3
	Edys Mills East	0.0	0.0	0.0	172.9	277.3	139.0	99.6	48.3
	Enniskillen 26	1.7	0.6	0.1	0.1	0.0	0.0	0.0	344.9
	Logierait	0.0	0.0	0.0	0.0	0.0	0.0	0.0	345.0
	Moore 2-22-II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2106.9
	Moore 3-21-XII	81373.4	79762.8	98016.6	79671.2	61378.0	60996.0	5646.0	0.0
	Moore 5-6-III	0.0	0.0	0.0	0.0	0.0	0.0	0.0	785.1
	Moore 7-27-VI	0.0	0.0	0.0	0.0	0.0	106.1	1132.5	771.3
	Oil City	0.0	0.0	0.0	0.0	2887.2	6397.8	5834.0	4876.3
	Oil Springs East	22265.0	19148.0	10153.0	6218.0	5794.8	4310.2	2829.6	2088.0
	Otter Creek	946.0	785.4	346.9	433.8	1090.1	966.4	845.0	657.1
	Otter Creek East	139.7	474.6	471.4	441.3	605.1	484.6	473.4	433.3
	Sarnia 1-8-A	0.0	0.0	0.0	0.0	308.7	0.0	60173.0	26947.0
	Sombra 3-26-VI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	214.3
	Sombra 4-9-XII	0.0	0.0	384.2	1237.7	904.7	712.2	26.0	0.0
	Subtotal	113201.9	113245.6	132812.7	103930.8	88149.8	88397.7	104511.9	75005.2
LINCOLN	Lincoln	305.2	267.1	215.5	219.8	228.2	276.6	249.2	256.7
	Subtotal	305.2	267.1	215.5	219.8	228.2	276.6	249.2	256.7
NORFOLK	Hemlock	2023.2	1735.1	1399.2	1133.4	737.1	724.5	925.0	870.9
	Norfolk	21985.8	26217.6	25092.9	20387.2	19305.4	19547.2	19886.1	21102.2
	Venison Creek	697.8	2407.9	3143.7	4604.4	4181.1	3567.8	2800.6	2357.5
	Wilsonville	0.0	0.0	105.4	0.0	0.0	0.0	0.0	0.0
	Wilsonville South	422.6	344.6	45.2	0.0	0.0	0.0	0.0	0.0
	Subtotal	25129.4	30705.2	29788.4	26125.0	24223.6	23839.5	23611.7	24330.6
OXFORD	Brownsville	63.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Innerkip	6316.5	6057.4	6394.1	7117.2	5809.3	5708.9	4418.7	4961.2
	Innerkip East	582.8	472.1	521.4	577.4	391.9	400.4	289.8	318.1
	Norwich South	47.7	70.6	26.7	0.0	0.0	0.0	0.0	0.0
	Subtotal	7010.3	6600.1	6942.2	7694.6	6201.2	6109.3	4708.5	5279.3
WELLAND	Welland	2991.7	1985.4	1914.9	681.9	719.0	783.0	950.4	951.2
	Subtotal	2991.7	1985.4	1914.9	681.9	719.0	783.0	950.4	951.2
WELLINGTON	Arthur	793.8	1476.8	1135.4	1267.9	1235.6	1181.5	1216.5	1235.8
	Subtotal	793.8	1476.8	1135.4	1267.9	1235.6	1181.5	1216.5	1235.8
	TOTAL PRODUCTION - ON SHORE	169312.5	177046.7	198107.6	163974.4	143946.6	141222.4	157961.1	134078.1

GAS PRODUCTION-LAKE ERIE	1979	1980	1981	1982	1983	1984	1985	1986
Atlas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clear Creek	32922.0	37333.9	50194.9	43357.0	53613.8	48429.5	53904.9	53180.6
Colborne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D'Clute	2722.8	2144.4	1891.6	2655.9	877.3	2122.9	2197.9	1743.2
Dover	28077.0	17823.5	16134.8	14233.0	17207.0	16243.0	13930.5	11368.4
Erieau	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leapfrog	0.0	5107.2	7453.8	6348.4	7417.0	4348.5	3888.4	3208.2
Maitland	51106.0	66962.8	71029.7	115654.0	115526.2	140992.1	150374.8	139479.9
Morpeth	0.0	47304.0	89008.4	94815.8	103197.8	88839.1	105008.1	92022.4
Selkirk	14746.0	14853.9	13828.0	12937.0	12036.8	13049.0	15931.1	16874.6
Silver Creek	64935.3	64643.4	55217.0	42709.9	53418.9	74863.7	68463.2	65965.4
Tilbury	16754.3	15684.1	14834.9	13977.1	15518.2	17902.2	17085.9	14188.4
TOTAL PRODUCTION - LAKE ERIE	208263.4	271857.2	319593.1	348688.1	379013.0	403787.0	430784.8	398031.1
TOTAL GAS PRODUCTION	377575.9	448903.9	517700.7	512662.5	522959.6	545009.4	588745.9	532109.3

TABLE 17.4

ONTARIO OIL PRODUCTION 1979 - 1986
(cubic metres)

COUNTY	POOL NAME	1979	1980	1981	1982	1983	1984	1985	1986
ELGIN	Aldborough 3-8-16-XII	0.0	0.0	0.0	0.0	0.0	1653.0	425.8	113.4
	Aldborough 4-A-VIII	0.0	361.6	346.7	188.0	119.1	77.0	53.4	51.8
	Dunwich 16-I	0.0	0.0	249.6	458.3	329.8	333.8	243.6	206.5
	Dunwich 18-I	64.1	79.1	33.4	62.1	32.9	64.2	33.5	33.4
	Rodney	24158.8	23430.9	21720.6	20788.8	20307.8	19450.1	19217.6	18798.7
	Wallacetown	151.9	151.9	151.9	36.4	63.0	55.9	118.8	93.3
	Willey	6778.0	7108.2	5382.0	4706.7	3843.0	3038.6	2755.7	2337.6
	Subtotal	31152.8	31131.7	27884.2	26240.3	24695.6	24673.6	22848.4	21634.7
ESSEX	Colchester	1043.0	696.4	709.7	864.4	953.4	887.8	930.4	706.5
	Comber	0.0	0.0	0.0	0.0	0.0	0.0	10.5	0.0
	Gosfield South	4590.0	3646.7	1951.0	1444.3	1223.5	1189.4	937.1	801.6
	Hillman	0.0	0.0	0.0	0.0	0.0	738.5	24451.8	43825.4
	Malden	283.0	418.4	346.2	339.4	348.9	349.5	265.7	332.9
	Malden 3-41-IV	72.0	262.4	270.6	165.6	149.7	106.7	115.0	85.4
	Mersea 6-15-B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	357.4
	Mersea 6-23-VII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	701.6
	Rochester 1-20-V EBR	0.0	0.0	0.0	0.0	0.0	69.8	135.3	56.7
	Ruscom River	17.0	57.0	29.0	0.0	0.0	0.0	0.0	0.0
	Staples	0.0	0.0	0.0	0.0	0.0	360.4	247.3	66.3
	Subtotal	6005.0	5080.9	3306.5	2813.7	2675.5	3702.1	27093.1	46933.8
HALTON	Hornby	0.0	0.0	0.0	0.0	0.0	0.0	8.0	25.0
	Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	8.0	25.0
HURON	Grand Bend	4460.9	4269.6	3294.5	2956.8	2784.6	2459.4	2235.1	1951.0
	Tipperary	0.0	148.8	250.2	133.8	128.3	118.8	77.0	47.7
	Tipperary South	0.0	0.0	0.0	159.1	9.0	0.0	0.0	0.0
	Subtotal	4460.9	4418.4	3544.7	3249.7	2921.9	2578.2	2312.1	1998.7
KENT	Bothwell-Thamesville	1423.5	1518.1	1403.9	1413.7	1477.8	1467.8	1410.2	1425.9
	Chatham	311.0	162.0	319.4	177.8	331.0	236.2	249.7	739.2
	Clearville	3324.0	3471.4	3102.8	2890.6	2208.5	2325.2	2175.6	2106.5
	Dover	65.0	75.7	55.8	54.7	[illegible]	651.5	330.4	222.4
	Dover 1-11-V E	0.0	0.0	0.0	0.0	0.0	3.3	6.8	0.0
	Dover 7-5-V E	0.0	0.0	0.0	0.0	2953.3	5380.3	13214.6	11365.8
	Dresden	182.2	181.7	166.7	139.3	145.1	129.9	114.0	115.2
	Fletcher	0.0	0.0	0.0	10.5	135.1	418.4	44.7	0.0
	Morpeth	0.0	0.0	0.0	0.0	25.0	27.0	42.7	26.7
	Romney 3-8-II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3170.6
	Prarie Siding	0.0	0.0	0.0	0.0	0.0	25.8	37.3	0.0
	Zone 5-III	92.0	34.5	42.0	31.0	18.7	7.0	0.0	0.0
	Zone 6-5-IV	0.0	0.0	0.0	118.3	43.9	26.1	20.0	0.0
	Subtotal	5397.7	5443.4	5090.6	4835.9	8189.6	10698.5	17646.0	19172.3
LAMBTON	Beaver Meadow	43.1	94.9	35.3	36.6	0.0	0.0	0.0	0.0
	Becher West	6172.4	6636.9	6419.0	5722.7	5340.6	5255.6	5049.8	4527.5
	Brigden	291.6	300.2	256.9	224.2	245.0	229.2	194.8	238.0
	Brooke	3029.4	2783.7	2451.9	1667.5	1593.9	1023.9	817.8	628.7
	Brooke 1-9-X	1393.4	784.7	535.0	351.9	296.9	178.6	133.0	65.1
	Brooke 2-24-X	0.0	0.0	0.0	0.0	0.0	27.1	6.6	0.0
	Brooke 5-14-XII	0.0	0.0	0.0	0.0	12.1	4.0	0.0	0.0
	Corey East	753.9	158.9	1577.3	3961.7	3358.2	2997.6	2788.0	2924.0
	Corunna	3017.6	2403.7	3524.1	2601.7	2080.8	2185.2	1795.1	2416.6
	Cromar	562.2	659.7	697.9	522.8	600.4	642.5	475.7	663.7
	Dawn 156	510.5	276.5	278.5	275.1	224.4	146.9	94.2	80.4
	Dawn 28-II	129.0	135.0	164.0	280.9	1554.9	4932.9	2736.0	3646.8
	Dawn 4-28-III	0.0	0.0	0.0	86.7	272.8	160.4	69.0	48.5
	Dawn 5-29-IX	0.0	0.0	121.0	354.1	127.8	7.0	0.0	0.0
	Dawn Misc.	1315.9	1515.2	1192.5	1598.0	1789.9	2101.2	1577.1	1901.6
	Edys Mills	698.2	1833.5	1906.7	1594.5	1406.0	1357.9	1305.6	1204.7
	Enniskillen 2-30-IX	318.7	266.6	86.3	26.4	58.3	48.1	41.2	24.5
	Enniskillen 7-30-IX	0.0	0.0	0.0	0.0	0.0	644.2	509.1	106.1
	Euphemia 8-18-IV	0.0	0.0	0.0	0.0	0.0	0.0	17.4	0.0
	Florence-Oakdale	0.0	0.0	0.0	0.0	0.0	38.4	21.6	0.0
	Ladysmith	2985.1	2900.9	2351.7	2110.9	2123.1	2266.4	2162.6	2433.7
	Logerait	0.0	0.0	0.0	0.0	0.0	0.0	8.8	99.1
	Moore 3-6-III	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9
	Moore 7-6-III	0.0	0.0	568.4	699.8	562.5	567.6	378.3	879.4
	Oil Springs	4123.0	4850.5	5396.0	5660.3	6069.7	5953.9	6169.3	5996.8
	Oil Springs East	63.0	363.0	68.0	47.0	22.9	14.4	24.5	0.0
	Osborne	105.0	28.6	149.9	94.1	76.5	47.5	43.8	38.3
	Otter Creek East	0.0	0.0	0.0	0.0	12.2	272.3	283.6	239.0
	Petrolia	3395.1	4917.2	4766.7	5445.4	6361.1	6244.6	6619.2	7508.3
	Petrolia East	3085.8	2835.4	2716.7	2279.1	1832.9	1915.8	1891.0	1460.9
	Plympton 5-19-VI	2897.4	3064.0	5400.7	4329.4	3269.7	2418.6	1881.0	1509.1
	Reckerton	1987.0	1928.6	1961.5	2061.2	1211.3	1986.7	1067.0	2124.3
	Reckerton North	1445.0	1563.9	1978.9	1792.5	1171.2	808.9	767.0	1063.4
	Shetland	0.0	0.0	12.3	11.1	5.3	15.4	15.2	12.2
	Sombra 18-VII	62.1	164.9	191.3	105.3	108.8	142.5	152.8	163.4
	Sombra 4-9-XII	0.0	0.0	0.0	5.6	4.3	0.0	0.0	0.0
	Sombra 6-28-IX	30.2	19.0	55.1	99.0	110.6	108.1	95.4	54.3
	Sutorville	87.3	104.6	105.7	96.0	98.9	84.2	70.4	73.1
	Wanstead	973.0	703.0	495.5	691.2	705.8	700.1	573.6	721.5
	Warwick	1103.0	922.8	860.6	767.8	688.4	584.8	552.3	486.4
	Warwick 6-17-IV BER	223.8	457.6	433.5	311.9	30.8	452.7	318.7	353.8
	Watford-Kerwood	0.0	0.0	0.0	0.0	32.9	0.0	0.0	0.0
	Wilsoncroft	0.0	0.0	24.5	8.8	31.8	7.7	9.1	0.0
	Subtotal	40801.7	42673.5	46783.4	45921.2	43502.7	46572.9	40735.6	43703.1
MANITOULIN	Manitoulin	0.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0
	Subtotal	0.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0
MIDDLESEX	Ekfrid 10-V-B	64.3	176.3	53.6	91.6	138.2	98.3	98.4	105.5
	Ekfrid 8-V-B	121.2	130.7	60.3	0.0	92.1	135.6	99.8	89.4
	Glencoe	0.0	0.0	249.0	293.5	356.1	264.7	810.1	1201.3
	Mosa	154.4	175.0	144.0	130.0	129.6	108.2	109.1	112.5
	Willey North	989.9	573.7	472.9	387.1	166.0	26.4	0.0	0.0
	Subtotal	1329.8	1055.7	979.8	902.2	882.0	633.2	1117.4	1508.7
OXFORD	Gobles	3657.0	3364.4	2425.1	1562.9	1438.1	1294.5	1067.9	644.4
	Innerkip	127.4	83.7	79.5	171.1	277.7	181.3	125.1	186.5
	Innerkip East	0.0	0.0	0.0	7.0	9.5	0.0	0.0	9.1
	Subtotal	3784.4	3448.1	2504.6	1741.0	1725.3	1475.8	1193.0	840.0
	TOTAL PRODUCTION	92932.3	93271.7	90093.8	88704.0	84610.3	90333.3	112953.6	138816.3

TABLE 17.5. ONTARIO'S POTENTIAL HYDROCARBON RESERVES

GEOLOGICAL AGE	GAS (million cubic metres)	OIL (thousand cubic metres)
Devonian	0	17 670
Silurian Carbonates	29 531	2 884
Silurian Sandstones	35 167	7
Ordovician	5 439	9 703
Cambrian	6 271	17 706
TOTAL	76 408	47 970

In October, an information seminar conducted by CEDIP personnel from Calgary was held in London. Participants expressed some concern about delivery of the program, as it is being administered from Calgary. A requirement to submit proposed seismic programs at least 10 days prior to actually acquiring the data was an additional concern due to the fact such programs are often short, 2 to 10 kms, and run on very short notice. Presently this particular aspect of CEDIP is causing no problems that cannot be worked out by negotiation between CEDIP officials and the local company.

PETREL ROBERTSON LTD.—ORDOVICIAN STUDY

In August, 1987, Petrel Robertson Ltd., formerly Robertson Research Canada Limited, undertook a study of nine selected Ordovician pools in southwestern Ontario for the purpose of providing its clients with an understanding of the geology and engineering aspects of these complex reservoirs. Additional plans include development of an exploration model that clients can use to enhance their exploration and development programs.

DEVRAN PURCHASE OF ONEXCO INTERESTS

Last year (Trevail *et al.* 1987) it was reported that the Government of Ontario had decided to wind down the affairs of Onexco Oil and Gas Limited, the exploration division of the Ontario Energy Corporation. Subsequently Devran Petroleum Ltd purchased the Ontario oil and gas assets of Onexco on October 1, 1986. The most significant outcome of this purchase is that Devran now owns a 16.33 percent working interest in the Hillman Pool, and a joint venture exploration program covering areas in Kent and Essex counties. Partners in the joint venture are The Consumers' Gas Company Ltd. and Pembina Exploration Limited.

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